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THESIS

THE RACE AGAINST NUCLEAR TERROR

by

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September 2005

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THE RACE AGAINST NUCLEAR TERROR

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ABSTRACT

In the wake of the September 11, 2001 attacks, the issue of political violence expressed via mass destruction has raised security concerns to an unprecedented degree not seen since the end of the Cold War. As a principal adversary, the Soviet Union has been replaced by terror networks applying asymmetric warfare to achieve politically charged or ideologically driven objectives. A scenario whereby non-state actors would acquire a nuclear capability not only threatens the security of the United States, but would destabilize the Westphalian notion of the primacy of nation-states within the international system. Despite US expenditures of over \$86 million to help nearly 30 countries world-wide in preventing the smuggling of weapons-useable radiological materials, over 20 known cases of such activity were reported between 1992 and 2001. Previous research has concentrated on a singularly defined threat: The Rogue State. Today's challenges are characterized by more defused, decentralized networks, to include transnational actors with the potential to proliferate and supply terrorists with a nuclear weapon or weapons-grade radiological material. This thesis examines the applicability of traditional Cold War strategies such as deterrence, pre-emption, prevention, and coercive diplomacy in the present context, to deny extremist groups and associated networks the means to buy, steal, or make nuclear and radiological weapons. This thesis proposes a multi-dimensional approach in support of mixed-strategies for winning the race against nuclear terror.

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EXECUTIVE SUMMARY

In the wake of the September 11, 2001 attacks, the issue of political violence expressed via mass destruction has raised security concerns to an unprecedented degree not seen since the end of the Cold War. As a principal adversary, the Soviet Union has been replaced by terror networks applying asymmetric warfare to achieve politically charged or ideologically driven objectives. A scenario whereby non-state actors would acquire a nuclear capability not only threatens the security of the United States, but would destabilize the Westphalian notion of the primacy of nation-states within the international system. Despite US expenditures of over \$86 million to help nearly 30 countries world-wide in preventing the smuggling of weapons-useable radiological materials, over 20 known cases of such activity were reported between 1992 and 2001.

Previous research has concentrated on a singularly defined threat: The Rogue State. Today's challenges are characterized by more defused, decentralized networks, to include transnational actors with the potential to proliferate and supply terrorists with a nuclear weapon or weapons-grade radiological material. Chapter I establishes a theoretical framework to explain rational choice theory and social mobilization theory as they apply to extremist motivations for mass destruction discussed in later chapters. Chapter II examines the literature on the subject of proliferation and supply networks with a review of recent cases. In addition, Chapter II provides a primer to understanding the basic characteristics and steps involved in developing nuclear and radiological weapons. Through the use of case studies, Chapter III will examine attempts by non-state actors to acquire nuclear weapons and radiological materials. Chapters IV and V examine the applicability of traditional Cold War strategies such as deterrence, pre-emption, prevention, and coercive diplomacy in the present context to deny extremist groups and associated networks the means to buy, steal, or make nuclear and radiological weapons.

The author concludes this thesis with the belief that the race against nuclear terror can be won if policy makers and the intelligence community take a multi-dimensional approach in developing mixed-strategies that are more nimble and responsive to dynamic threats. A two-part framework is presented at the conclusion of this thesis.

I. INTRODUCTION

"Always remember, however sure you are that you can easily win, that there would not be a war if the other man did not think he also had a chance."

-- Winston Churchill¹

The purpose of this thesis is to consider traditional strategies such as deterrence, pre-emption, prevention, and coercive diplomacy and assess their applicability to counter the threat of nuclear and radiological terrorism. In the wake of the September 11, 2001 attacks, the issue of mass-destruction has raised security concerns to an unprecedented degree not seen since the end of the Cold War. Gone are the days when the U.S. concentrated its efforts against a single rival superpower. As a principal adversary, the Soviet Union has been replaced by terror networks applying asymmetric warfare to achieve politically charged or ideologically driven objectives. Previous research has concentrated on a singularly defined threat: The Rogue State. Today's challenges are characterized by more defused, decentralized networks, to include transnational actors with the potential to proliferate and supply terrorists with a nuclear weapon or weapons-grade radiological material. Despite US expenditures of over \$86 million to help nearly 30 countries world-wide in preventing the smuggling of weapons-useable radiological materials, over 20 known cases were reported between 1992 and 2001.² The author contends that terrorist groups cannot acquire nuclear or radiological technology without the witting or unwitting support of state actors.

¹ Winston S. Churchill, *My Early Life: Roving Commission* (London: The Reprint Society, 1944), 245.

² U.S. General Accounting Office, "Nuclear Nonproliferation," <http://www.gao.gov/new.items/d02426.pdf>, (May 2002): 34-39.

A. SCOPE AND METHODOLOGY

Terrorism experts have long considered the sub-national threat in nuclear terrorism³ but al Qaeda's shift in strategy to attack the "far enemy" has brought the prospect of mass-violence to the forefront in the minds of U.S. policy-makers and senior leaders.⁴ With the proliferation of weapons of mass destruction (WMD) and the ubiquity of information technology, the potential to access such destructive capabilities on a global stage has never appeared more likely. As one leading expert has said, "for the first time in human history very small groups have, or will have, the potential to cause immense destruction."⁵ For the purpose of this thesis, the author will use the US government's definition for *terrorism* defined as "premeditated, politically motivated violence perpetrated against noncombatant targets by sub-national groups or clandestine agents, usually intended to influence an audience."⁶

To focus the scope associated with the term WMD, we must start with defining what constitutes "weapons of mass destruction." In a recent *Foreign Affairs* article, Ashton Carter, professor of science and international affairs at Harvard University, writes:

The term WMD generally applies to nuclear, biological, and chemical weapons; ballistic missiles; and, more recently, 'dirty bombs,' ordinary explosives containing some radioactive material. But this definition is too broad. Chemical weapons are not much more lethal than conventional explosives and hardly deserve the WMD label. Similarly, long-range ballistic missiles are especially destructive only if they have a nuclear or biological warhead, and should be considered a separate category. Dirty bombs cause

³ See Brian Jenkins, "Will Terrorists Go Nuclear?" Santa Monica, CA: RAND, 1975; and Thomas Schelling, "Thinking about Nuclear Terrorism," *International Security*, Spring 1983, Vol. 6 No. 4. Retrieved from JSTOR on 4 May 05.

⁴ Marc Sageman. "The Global Salafi Jihad," *The 9/11 Commission on the Terrorist Attacks Upon the United States*, 9 July 2003, http://www.911commission.gov/hearings/hearing3/witness_sageman.htm, (12 June 05); for more details, see "The 9/11 Commission Report," New York: W.W. Norton and Company, 2004, 59.

⁵ Walter Laqueur, "The Terrorism to Come," *Policy Review*, No. 126 (August and September 2004), <http://www.policyreview.org/aug04/laqueur.html> (accessed on July 23, 2005); last section, para 8.

⁶ US Department of State, "Pattern of Global Terrorism", xii. NOTE: The author explores the US government's definition in greater detail in Chapter IV.

local contamination and costly cleanup but not true mass destruction; they too should be given lower priority. The primary focus of counterproliferation policy, therefore, should be nuclear and biological weapons.⁷

Implied by Carter's statement is the diverse technical nature and military significance of each weapon. The author argues that a one-size-fits-all policy would contradict the complex nature of grouping chemical, biological, radiological, and nuclear weapons under the banner of WMD. Therefore, it is the author's intent to focus this research in proposing a second look at applying traditional strategies to mitigate the threat of nuclear terror and the availability of nuclear and radiological weapons. Finally, the author uses case studies and heuristics to develop a better understanding of traditional strategies applied against non-state actors specifically, proliferation, supply and terrorist networks.

B. THEORETICAL FRAMEWORK

Until recently, contemporary thought on the cause of those who resort to terrorism was understood as disenfranchised individuals within society who sought violent means to gain attention for political grievances and social injustice. In the 1970s, Brian Jenkins, a top terrorism expert from the RAND Corporation, once argued that "Terrorists want a lot of people watching, not a lot of people dead."⁸ Prior to the Oklahoma City bombing, the attack on the Pentagon, and World Trade Center, terrorism was viewed as something that occurred elsewhere, in distant lands or in troubled regions. Clearly these events awakened many within the U.S. to the horrors of domestic and international terrorism and brought the notion of instrumental violence to America's shores. Consequently, analysts and senior leaders alike have sought various theories in order to help explain of how best to understand terrorism. For this study, the author will refer to rational choice theory and social mobilization theory in order to analyze and explain the role of non-state actors. The objective is to assess potential options and opportunities in which to shape potential strategies.

⁷ Ashton B. Carter, "How to Counter WMD," *Foreign Affairs*, Sept/Oct 04, Vol 83 No 5, pg 73

⁸ Brian Jenkins, "The Potential for Nuclear Terrorism," (Santa Monica, CA: RAND Corporation, P-5876, 1977), 8.

1. Rational Choice Theory

In its most basic form, rational choice theory is concerned with a micro-level perspective of individual or group level motivation and decision-making. That is, the outcome of a given situation becomes more or less appealing depending on the “payoff” or “utility” (the benefits minus costs) of the end result, combined with the likelihood, or *probability* of that result occurring from a set of choices.⁹

Application of Rational Choice Theory
Utility = (Benefits – Costs) X Probability of Success (Choice <i>n</i>)

Table 1. Rational Choice Theory (RCT)¹⁰

The study of rational choice theory is often applied at the micro-level to explain the logic in individual decision-making. However, rational choice theory may also be used to explain the collective action and decision of individuals to join, or abstain from joining, a terrorist group. Decisions to join are often times predicated on personal interests, resources, or situational constraints.¹¹ Conventional rational choice theorists would argue that the “free rider” problem would appear counter-intuitive for an individual to join a terrorist group. In essence, why should an individual join an extremist group and incur the potential cost when he or she could derive the same mutual benefits whether in the group or not? That is, that the utility, or payoff, derived from a successful terrorist campaign would be shared by all of the group’s individuals, despite the level or extent of their participation in achieving organizational goals. Martha Crenshaw counters this argument by suggesting that part of the answer is psychological.¹²

⁹ Graham Allison and Philip Zelikow, *Essence of Decision*, (New York: Allison-Wesley Educational Publishers Inc, 1999), 16-21.

¹⁰ Author’s adaptation of Rational Choice Theory as explained in *Essence of Decision* by Allison and Zelikow.

¹¹ Doug McAdam et al. *Dynamics of Contention*, (Cambridge, UK: Cambridge University Press, 2001), 41-50.

¹² Martha Crenshaw, “The Logic of Terrorism,” in *Origins of Terrorism* by Walter Reich, (Washington D.C.: Woodrow Wilson Center Press, 1998), 8-9.

Further, she suggests that individuals participate in such activity as part of a collective action motivated by social factors such as kinship, friendship, and personal ties.

However, rational choice theory is not only limited to understanding individual motives, but may be applied towards developing a framework in understanding the strategic level decision-making by actors pursuing specific courses of action. To a great extent, the rational choice paradigm has dominated conventional thinking throughout the post-cold war period. Thomas Schelling and Graham Allison have developed theoretical models to help explain the logic of decision-making by seemingly rational actors. According to Crenshaw, Schelling suggests that “terrorism is one form of violent coercion, a bargaining process based on the power to hurt and intimidate as a substitute for the use of overt force.”¹³ Taken to an extreme, nuclear and radiological weapons have the coercive potential to influence nation-state decision-making.

2. Social Mobilization Theory

If we are to assume that terrorist actions are rational, then we should also consider their path to radicalization. Understanding the dynamics of contention that compel individuals and groups to organize is essential to developing a basic strategic framework to counter extremist ideologies that promotes and advocates social change through violent means. Likewise, critical analysis must also develop an understanding of a movement’s set of shared ideas, beliefs and values within a community or society that justify and enable such actions. The study of social mobilization is concerned with these issues as well as the organizational, or meta-level, dynamics of individual and group development. Sidney Tarrow describes social movements as “those sequences of contentious politics that are based on underlying social networks and resonant collective

¹³ Martha Crenshaw, “Theories of Terrorism: Instrumental and Organizational Approaches,” in *Inside Terrorist Organizations* edited by David Rapoport, 13, (New York: Columbia University Press, 1988).

action frames, which develop the capacity to maintain sustained challenges against powerful opponents.”¹⁴

Scholars widely believe that terrorist groups emerge out of radicalized factions of a larger social movement.¹⁵ As Tarrow states, “violence is the most visible trace of collective action.”¹⁶ Social Mobilization Theory (SMT)¹⁷ enables a deeper and broader understanding of the path towards radicalization taken by terrorist groups. SMT provides a basic framework to integrate and analyze structural and rational actor models towards affecting the actions of non-state or sub-state actors. In the war on terror, this level of study becomes more significant as policy-makers seek to develop strategies to affect, influence, or deter non-state actors. In other words, to develop effective strategic options we must broaden our perspective from traditional theories of working from the top down or bottom up to one that analyzes from the group level out.

¹⁴ Sidney Tarrow, *Power in Movement: Social Movements and Contentious Politics*, (New York: Cambridge University Press, 1998), 2.

¹⁵ Donna Della Porta, *Social Movements, Political Violence, and the State*, (New York: University of Cambridge, 1995), 187-191.

¹⁶ Tarrow, *Power in Movement*, 94.

¹⁷ NOTE: Depending on the author, the term Social Mobilization Theory is also referred to as Social Movement Theory. For the purpose of this thesis, the author applies the same meaning to both terms and considers them interchangeable.

Theoretical Approach

Macro:

- Structuralist/Neorealist Theory
- Rational Actor Model
- Rational Choice Theory

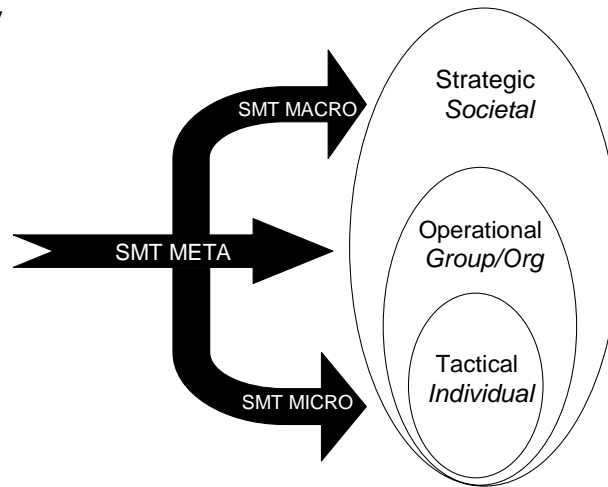
Meta:

- Organizational Theory
- *Social Mobilization Theory*
- Sociology

Micro:

- Rational Actor Model
- Rational Choice Theory
- Psychology

Levels of Analysis



* SMT draws from other theories & re-applies them from an organizational perspective to analyze societal, group, & individual dynamics/influences. Rather than a top down or bottom-up approach, SMT takes a organizational level view of how to apply strategic, macro, and micro level theories.

Figure 1. Social Mobilization Theory (SMT)¹⁸

By applying a social mobilization framework we may begin the study of understanding the interrelationships and dynamics that are associated with those who promulgate violence and contention, the networks and alliances that are formed, and the cultural framing associated with packaging the justification for such extreme measures. In this process, our objective is to analyze the various processes or moving parts that may be implicitly or explicitly “connected” with a movement or between networks. A social movement in and of itself may be too big and diffused to analyze in its entirety. For the purposes of this study we shall look at three key factors that shape an understanding of SMT: the structure and political environment, in terms of opportunities and constraints facing a movement; the mobilizing structures, wither formal or informal, available to members of a movement; and the collective process by which particular actions are interpreted or framed.

¹⁸ Author’s adaptation from a collection of readings by della Porta, Crenshaw, McAdam, Tilly, and Tarrow. NOTE: Additional theories would most certainly apply; however, the intent of this model is to provide a simplified model view of how SMT fits among other theoretical tools.

C. ORGANIZATION AND STRUCTURE

This thesis uses a combined approach of case studies and heuristics to examine the applicability traditional strategies of coercive diplomacy, preemption, prevention, and deterrence against non-state actors. The impetus for the concern over the possibility of nuclear terrorism is often attributed to two main reasons. First, the collapse of the former Soviet Union and an economy in disarray led to increased opportunities for the proliferation of nuclear and radiological materials. Chapter II examines the literature on the subject of proliferation and supply networks with a review of recent cases. Furthermore, this chapter provides a primer to understanding of the characteristics and the basic steps involved in developing nuclear and radiological weapons.

The area of concern leading observers to believe in the threat of nuclear terrorism is the belief that the real focus behind this “new” threat rests in the changing nature of political violence by extremist groups. However, while the author accepts the notion that extremist motivations are a critical component to terrorism, this thesis will concentrate on the aspect of extremist motivations as it pertains to mass destruction. Through the use of case studies, Chapter III will examine attempts made by non-state actors to acquire nuclear weapons and radiological materials. Chapter III compares and contrasts the effort of Aum Shinrikyo and al Qaeda.¹⁹

In Chapters IV and V, this thesis examines the strategies of coercive diplomacy, preemption, prevention, and deterrence in order to assess its applicability against networks and non-state actors. Not since the Treaty of Westphalia and the creation of the modern system of nation states, has the international community faced a potential shift in foreign diplomacy. The author argues that the rise of sub-state actors with the coercive power to destabilize the Westphalian system poses a threat not only to the United States but to the

¹⁹ NOTE: This chapter was previously published in *Strategic Insights*, Vol. IV, Issue 5, by the Center for Contemporary Conflict at the Naval Postgraduate School, Monterey, CA on May 2005. A copy of article originally titled “Terrorist Motivations for the Use of Extreme Violence” may be found at <http://www.ccc.nps.navy.mil/si/2005/May/gomezMay05.asp>.

primacy of nation-states within the international system. As a result, the final chapter focuses on the application of strategies traditionally used between states, against non-state actors as way of understanding how they may be applied in today's context.

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II. DEFINING NUCLEAR AND RADIOLOGICAL WEAPONS: MASS DESTRUCTION OR DISRUPTION?

A. OVERVIEW

In recent testimony before Congress on national security threats both current and projected, Porter Goss, the Director of Central Intelligence (DCI), stated that "it may be only a matter of time before al Qaeda or another group attempts to use chemical, biological, radiological, and nuclear weapons."²⁰ In fact, representatives from all the intelligence and national-security agencies to include FBI, DIA, DHS, and the State Department's Intelligence and Research Bureau (INR) all agree that the question is no longer if, but when such an attack will occur. As one leading expert has said, "for the first time in human history very small groups have, or will have, the potential to cause immense destruction."²¹ While we may find solace in the fact that, since 9/11, the U.S. has not witnessed another major attack on U.S. soil, the lack of control of fissile material in the former Soviet Union, the potential of a nuclear Iran and North Korea, is of grave concern. Adopting the position that the primary focus of counterproliferation policy should be reserved for a true weapon of mass destruction such as a nuclear and radiological weapon, this chapter will focus three key areas such as (1) the impact of coercive tools used by non-state actors such as suicide terrorism; (2) global nuclear proliferation; and (3) a look at the characteristics of what makes a nuclear weapon.

B. TERRORIST MOTIVES

For some extremists, suicide terrorism is a form of instrumental violence that serves as a coercive tool aimed at achieving specific political objectives. Similarly, one could argue that nuclear terror, like suicide terrorism, may serve a strategic purpose for terrorist organizations as a means to coerce governments

²⁰ Derek Reviron. "Security Surprises Pose Challenge," *CBS News*, March 3, 2005, <http://www.cbsnews.com/stories/2005/03/03/opinion/main677863.shtml> (accessed on July 23, 2005).

²¹ Walter Laqueur. "The Terrorism to Come," *Policy Review*, No. 126 (August and September 2004), <http://www.policyreview.org/aug04/laqueur.html> (accessed on July 23, 2005).

to yield to specific demands. While nation-states apply coercive tactics such as the threat of economic sanctions or conventional firepower as a means of compelling rival governments, terrorists are more likely to apply indirect approaches such as bombings or suicide terror as coercive tools.²² Thus, logic emerges that terrorist pursuit of nuclear weapons as a coercive tool may serve to further political and strategic objectives. Therefore, to better understand the potential effectiveness of coercive tools used by terrorists, one can observe apply the experience of suicide terrorism as a means of determining future success of other weapons of terror.

In a recent article, Professor Robert Pape of the University of Chicago explains five key observations on how terrorist organizations have assessed the effectiveness of suicide attacks and the limits of their coercive ability. First, the author states that “suicide terrorism is strategic.” He asserts that the majority of suicide attacks occur as part of an organized group in support of a broader strategic framework to support a greater goal. Second, the “strategic logic of suicide terrorism is specifically designed to coerce modern democracies to make significant concessions to national self-determination.” Third, “during the past 20 years, suicide terrorism has been steadily rising because terrorists have learned that it pays.” Suicide terrorists sought to compel American and French military forces to abandon Lebanon in 1983, Israeli forces to leave Lebanon in 1985, Israeli forces to quit the Gaza Strip and the West Bank in 1994 and 1995. These examples only seem to fuel perceptions that democracies lack the internal fortitude to sustain such extreme acts of violence. Following this logic, the Madrid Bombings which occurred 3 days before a nation wide general election, resulted in the death of 192 civilians. The dramatic events had an immediate impact on the Spanish elections and subsequent withdrawal of Spain’s troops in Iraq. Published reports would later reveal that al Qaeda had a strategic intent in targeting Spain. In a document posted on Islamist websites and analyzed by the

²² Robert Pape. “The Strategic Logic of Suicide Terrorism,” *American Political Science Review* 97, no. 3 (August 2003): 1-19. NOTE: Report covers a 21 year period from 1980 to 2001.

Norwegian Defense Research Establishment (NDRE) revealed that extremists believed Spain was “very vulnerable to attacks on its forces, primarily because public opposition to the war is total, and the government is virtually alone on this issue.”²³

Pape believes that “although moderate suicide terrorism led to moderate concessions, these more ambitious suicide terrorist campaigns are not likely to achieve still greater gains and may well fail completely.” States may choose to abandon or concede short-term goals in lieu of any major concessions. Decisions that would have long term implications such as compromising the state’s overall security, significant loss of territory, or economic deprivation would be unlikely. Secondly, the “most promising way to contain suicide terrorism is to reduce terrorists’ confidence in their ability to carry out such attacks on the target society.” In this case, the goal is to build such a defense that the act of planning, preparing and executing a suicide attack is so formidable that efforts to acquire and detonate a nuclear bomb would be futile. Although suicide terrorism is one tactic used by terrorists, other potential tactics would prove equally as difficult if not more so may include pre-positioning nuclear or radiological bombs in key locations such as major ports and waterways, transportation centers or key facilities in densely populated areas or cities. Early theorists have identified the potential threat posed by terrorist in targeting nuclear reactors and power plants. As Graham Allison points out in *Nuclear Terrorism*, nuclear reactors may be hardened to some degree remain vulnerable to attacks of the kind seen on 9/11.²⁴

²³ Brynjar Lia and Thomas Hegghammer. “Jihadi Strategic Studies,” *Studies in Conflict and Terrorism*, Vol. 27, iss. 5 (2004): 368-369. NOTE: The originator/author of this document is unknown but the NDRE believes al-Qaeda’s “Services Bureau” (maktab al-khidamat) is likely to have written the original text. For more information on the document in its original form, see “FFI Explains al-Qaeda Document” at the *Forsvarsnett* website at <http://www.mil.no/felles/ffi/start/article.jhtml?articleID=71589>. Last accessed September 23, 2005.

²⁴ Graham Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe* (New York: Times Books, 2004), 196-198.

C. GLOBAL PROLIFERATION

On March 11, 2005, United Nations Secretary-General, Kofi Annan addressed the International Summit on Democracy, Terrorism and Security in Madrid, Spain that if extremists carried out a nuclear attack, “it would not only cause widespread death and destruction, but would stagger the world economy and thrust tens of millions of people into dire poverty.”²⁵ His speech, presented on the first anniversary of the Madrid bombings, underscores the concerns shared by many within the international community. Closer to home, the 9/11 Commission revealed that al Qaeda had “tried to acquire or make a nuclear weapon for at least ten years.”²⁶ Then Director for Central Intelligence George Tenet warned that “more than two dozen other terrorist groups are pursuing CBRN (chemical, biological, radiological, and nuclear) materials.”²⁷ Yet how would terrorist groups acquire such weapons? Which is more realistic? That a terrorist, buy, steal, or make a nuclear weapon?

In the 1970s, experts argued that terrorists would not try to maximize casualties; instead, they were more inclined to employ violence in a limited way to sufficiently coerce concessions from governments. As stated previously, Brian Jenkins once argued that “Terrorists want a lot of people watching, not a lot of people dead.”²⁸ This long-held view was later supported by other terrorism experts such as RAND colleagues Peter de Leon and Bruce Hoffman who at the time believed that the “vast majority of terrorist organizations are not particularly innovative” but that the innovation that has occurred has been in the choice of

²⁵ Adnkronos, “UN: Conference Seeks to Close Nuclear Loopholes,” *Adnkronos International*, July 6, 2005, http://www.adnki.com/index_2Level.php?cat=Security&loid=8.0.184137838&par=0 (July 28, 2005).
NOTE: In a speech before 100 delegates from 90 nations, the Secretary General considered preventing a nuclear attack as “perhaps the most important thing of all.”

²⁶ National Commission on Terrorist Attacks, *The 9/11 Commission Report*, (New York: W.W. Norton & Company Inc, 2004), 380.

²⁷ *Ibid.*, 380.

²⁸ Brian Jenkins, *The Potential for Nuclear Terrorism*, (Santa Monica, CA: RAND Corporation, P-5876, 1977), 8.

targets rather than in the use of sophisticated weapons.²⁹ At the time, the belief was widely held that the use of such weapons would appear inconsistent with terrorist objectives and that a large attack causing massive casualties would lead to alienation from the very audience from which they wish to recruit or, at a minimum, influence.³⁰

Since 9/11, the landscape has changed and few terrorism experts would suggest that there are not at least some extremists who do want to inflict mass casualties. In that context, nuclear terror not only represents an effort to intimidate and coerce, but also poses a critical threat to states and the global community. With regards to nuclear proliferation, today's problem is an outgrowth of three key events. First, the break-up of the former Soviet Union led to a tremendous lack of control over the security and accountability of fissile material. Second, despite states who have chosen to de-proliferate, there are still those who, for their own interests, have chosen to continue the pursuit of fissile and nuclear technology. Finally, the father of Pakistan's nuclear program, A.Q. Khan, accelerated the availability of nuclear technology and fissile material, by running a global nuclear "Wal-Mart" that introduced the world to a new, more prolific kind of black market.

1. Post-Cold War Russia

The lack of control over fissile material in Russia after the break-up of the Soviet Union became a fear in the 1990s. Having the world's largest stockpile of weapons-grade and weapons useable nuclear materials, highly enriched uranium (HEU) and plutonium (Pu), Russia is of particular attention to the world community. According to the Director for Non-Proliferation at the Carnegie Endowment for International Peace in Washington, D.C., Joseph Cirincione states that:

²⁹ Peter de Leon and Bruce Hoffman with Konrad Kellen and Brian Jenkins, *The Threat of Nuclear Terrorism: A Reexamination*, (Santa Monica, CA: RAND Corporation, N-2706, 1985), 4.

³⁰ Peter de Leon and Bruce Hoffman, *The Threat of Nuclear Terrorism: A Reexamination*. 12.

Reliable estimates of the total Russian nuclear material stockpile vary, some running as high as 150 metric tons of plutonium and 1,500 metric tons of highly enriched uranium. Of this material, approximately 700 metric tons are thought to be in nuclear weapons. The actual amount of material produced and held by Russia will never be known with certainty since the production of plutonium and other materials cannot be fully accounted for even in the best of circumstances (the United States' own accounting has a margin of accounting error of 1 metric ton).³¹

Based on IAEA standards, Russia's stockpile would translate to 60,000 highly-enriched uranium grade and 18,750 plutonium grade nuclear weapons or 37,500 plutonium grade nuclear weapons by U.S. DOE standards.³² The numbers are staggering when one considers the destructive potential. Complicating matters further is the difficulty associated with securing the large quantities of such fissile material. The graph below compiled from data derived from the International Atomic Energy Agency (IAEA) and the General Accounting Office (GAO) reflects the number of total incidents involving radiological material of which is a number of cases involved weapons-useable materials. Where possible, the author provides the country of origin corresponding to each case involving weapons-useable material. Between 1992 and 2001, there were 20 known cases of which 15 were confirmed or suspected to have originated out of Russia or former-Soviet states. For a summary of each incident, please refer to Appendix B.

³¹ Joseph Cirincione, *Deadly Arsenals: Tracking Weapons of Mass Destruction* (Washington, D.C.: Carnegie Endowment for International Peace, 2002), 115.

³² Ibid., 37. NOTE: To put this in perspective, the International Atomic Energy Association considers 25 kilograms of highly enriched uranium and 8 grams of plutonium as highly significant. The U.S. Department of Energy (DOE) states that only 4 kilograms of plutonium is all that is needed to produce a basic nuclear weapon.

Confirmed Illicit Trafficking Incidents from 1992-2001										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Incidents involving radioactive material (Source: IAEA)	N/A	56	91	40	24	30	38	50	53	54
Weapons-useable material (Source: GAO database)	1	3	6	3	0	0	0	2	3	2
Source of Material traced to the country of origin (Source: GAO database)	(1) Russia	(3) Russia	(5) Russia (1) Unk	(3) Russia	0	0	0	(1) Russia (1) Unk	(2*) Russia (1) Germany	(2) Unk

Note: Uranium enriched with 20 % or higher U-235 is considered weapons-usable material. One kilogram equals 2.2 lbs. One thousand grams equal 1 kilogram and 1 gram is equal to about 0.04 ounces, or the weight of a paperclip. * In 1 of 2 cases, Ukraine was also a possible source for this material.

Table 2. Cases and countries involving weapons-useable material³³

In reviewing the specific cases, much of the weapons-grade material can be directly used in nuclear weapons without the need for chemical reprocessing. According to reports by the International Atomic Energy Agency, Russia and Ukraine have had several cases in which attempts to smuggle nuclear-weapons-useable material have been thwarted by authorities yet it remains unclear as to whether all material is accounted for.³⁴ Despite efforts to secure such radioactive material, the fall of the former Soviet Union has resulted in a decrease in physical security, accountability, and control of sites throughout various facilities in the former Soviet republics. Such concern raises the stake for the potential of illicit diversions by non-state actors, sympathizers to extremist cause, transnational

³³ Rensselaar Lee, "Nuclear Smuggling and International Terrorism: Issues and Options for U.S. Policy," *Library of Congress*, Congressional Research Service, Order Code RL31539, (October 22, 2002): 4-8; U.S. General Accounting Office, "Nuclear Nonproliferation," <http://www.gao.gov/new.items/d02426.pdf>, (May 2002): 33-39; and International Atomic Energy Agency, "The IAEA Illicit Trafficking Database (ITDB)," http://www.iaea.org/NewsCenter/Features/RadSources/fact_figures2004.pdf, 2004.

³⁴ Cirincione, *Deadly Arsenals: Tracking Weapons of Mass Destruction*, 116.

criminal networks, or desperate individuals with the desire to acquire sell nuclear material for profit or financial gain.³⁵

Despite the obvious gravity of the potential counterterrorist threat, nuclear experts have recently stated that “they (now) consider the danger more distant than immediate.... This is not due to the absence of such attacks, but because terrorists face technical and logistical obstacles, most notably in their attempts to acquire nuclear weapons.”³⁶ However, the potential for excess material to wind-up in the hands of a black-market proliferators, terrorists, or state actors looms large and until standards for securing and accounting of such hazardous material improves the likelihood that potential terrorists to learn through trial and error cannot be ignored. Once again, the debate is ensconced by the notion that terrorists must overcome certain technical and logistical challenges in order to use such devices. However, in a recent speech, Bruce Hoffman argues that “al Qaeda’s ability to change is reflective of their determination, adaptiveness, and resiliency.”³⁷ His words appear to reflect that al Qaeda itself is a learning organization. If given the opportunity, in time such as determined organizations may overcome what appears today as obstacles.³⁸ In fact, even in the early literature critical of the possibility of nuclear terrorism, the possibility of such an act cannot easily be easily discounted.

2. State Interests

Adding to the challenge of proliferation is the desire by state-actors to acquire a nuclear capability. These motives have remained unchanged. In his essay, “Why do States Build Nuclear Weapons,” Scott Sagan explains how states determine and justify the need to build or not build nuclear weapons.

³⁵ Falkenrath et al., *America’s Achilles’ Heel*, 130-131.

³⁶ Jane’s Intelligence Digest, “Nuclear Threats in 2005,” *Jane’s Intelligence Digest*, posted January 12, 2005 at www.jid.janes.com (accessed January 15, 2005).

³⁷ Lecture presented by Dr. Bruce Hoffman on 2 Dec 04 at The New York University Center on Law and Security, sponsored by the New America Foundation. Last accessed on 27 May 05 at <http://newamerica.net/index.cfm?pg=event&EveID=430>

³⁸ NOTE: A recent two volume study by the RAND Corporation title *Aptitude for Destruction* (MG-331 and MG-332) explores the subject of organizational learning by terrorist groups in much greater detail.

Sagan presents his theory using three basic models that is best summarized by the following:

'The security model,' according to which states build nuclear weapons to increase national security against foreign military threats; 'the domestic politics model,' which envisions nuclear weapons as political tools used by individuals and organizations to advance their parochial interests; and 'the norms model,' under which nuclear weapons acquisition, or restraint in weapons development, is determined by the symbolic role of such weapons in a state's modern identity.³⁹

Over 20 years ago, Thomas Schelling wrestled with the link between the state and terrorism where the genuine use of or pretended nuclear capability in itself would reflect a state who, through its actions, appears to "descend" to the status of a terrorist organization.⁴⁰ However, Schelling explains that:

An organization other than a national government that possesses or could credibly claim to possess nuclear weapons conversely might "ascend" to the status of government. It might seek its own permanence a nuclear mini-state, even if lacking territory. Or it might claim a territory or seek a homeland, identifying itself as the rightful claimant to the legitimate authority in some existing state.⁴¹

Such coercive potential places the onus on states to consider, that the threat of nuclear terror poses a challenge to the Westphalian construct as duly recognized states. Schelling goes further by not ruling out the possibility of terrorist organizations gaining the "status and 'prestige' that are supposed to go with the fearsome accomplishment of producing or otherwise acquiring a nuclear bomb...can achieve diplomatic recognition."⁴² Placed in this context, the question about what to do with excess nuclear material would appear to extend beyond non-proliferation and to policies reducing the number of states who

³⁹ Scott Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security* 21, no. 1 (Winter 1996/1997): 55.

⁴⁰ Thomas Schelling, "Thinking about Nuclear Terrorism, *International Security*, Spring 1983, Vol. 6 No. 4. (Retrieved from JSTOR on 4 May 05), p. 68.

⁴¹ Ibid., 68.

⁴² Ibid.

produce radiological materials. Such an approach would be aimed towards the eliminating the creation of additional nuclear-capable states.

In a more recent article, Ariel Levite analyses the factors that led countries to de-proliferate and discontinue their programs. (See Appendix A for a breakout.) Countries like Argentina, Brazil, and South Africa renounced their pursuit of nuclear development by opening all of their nuclear facilities to inspection in accordance with the Nuclear-Proliferation Treaty and the IAEA.⁴³ In doing so, these states agreed to not acquire nuclear weapons, and not to assist non-weapon states from developing their own nuclear capabilities, while agreeing to international inspections for the purposes of verifying compliance.⁴⁴ In return, these states would receive compensation in the way of favorable economic incentives as well as assistance in developing commercial nuclear power.⁴⁵ In summary, Levite argues that states decide to discontinue pursuit for a number of reasons. He states that common to each of these examples is:

Some diminution of the perceived utility of nuclear weapons either because (1) the external security situation of a state improves or alternatives to nuclear weapons emerge that make them unnecessary; (2) a change occurs within the domestic regime and the state's security and/or economic orientation (central planning vs. market economy); or (3) systemic or state-specific incentives, such as new norms, emerge that diminish the appeal of nuclear weapons.⁴⁶

While states have multiple reasons to de-proliferate, others like North Korea and Iran believe that it is in their best interests to go nuclear. According to Dr. Richard Falkenrath, former deputy Homeland Security Advisor to President Bush, believes that "states have powerful incentives against initiating NBC (nuclear, biological, and chemical) weapons use in war against similarly armed

⁴³ Carnegie Endowment for International Peace, "Nuclear Weapons Status," Carnegie Endowment, <http://www.carnegieendowment.org/images/npp/nuke.jpg> (accessed March 17, 2005).

⁴⁴ Carl E. Behrens, "Nuclear Nonproliferation Issues," *Library of Congress*, Congressional Research Service, Order Code IB10091, (January 13, 2005): 3.

⁴⁵ *Ibid.*, 4-5.

⁴⁶ Ariel E. Levite, "Never Say Never Again", *International Security*, Vol. 27, No. 3 (Winter 2002/03), 68.

adversaries. The risks of retaliation in kind, hostile reaction, domestic political backlash, and moral opprobrium serve as effective brakes on such highly destructive acts.”⁴⁷ In accepting this point of view, however, states that chose to directly support terrorist activities by providing nuclear or radiological materials directly would do so at their own risk. This would also assume that the risks described have a direct affect within a state’s domestic constituency and international community. A state that desires support from its international neighbors or concerned with internal unrest such as the case of Moammar Khadafi and Libya would be more likely to be influenced by such factors as suggested by Dr. Falkenrath. In contrast, terrorist networks do not share the same constraints as state actors. In fact, according to the Saudi Cleric Shaykh Nasir Bin Hamd Al-Fahd who issued his fatwa in May 2003 to justify the use of WMD, advocates the “permissible” use a bomb that can kill 10 million people as legitimate. Among states, North Korea, with its application of coercive measures as a way of conducting diplomacy, poses a different threat. The potential for a future Nuclear Black Market cannot be understated.

In sum, the challenge to the Westphalian construct of nation-states would be impacted by the coercive potential of non-state actors in acquiring a true weapon of mass destruction. While regimes like the IAEA were created to set-up control measures to manage who enters and exits the nuclear arms club, non-state actors who are determined to acquire a nuclear weapon may take advantage of the materials that lie in facilities with minimum security or those vulnerable to the insider threat. As of December 31, 2004, over 650 incidents involving uncontrolled radioactive were confirmed by the IAEA who believes that about 30% involved nuclear material while 60% of these incidents were other radioactive material.⁴⁸ The same report points to about half of the number of incidents involving criminal activities such as theft, smuggling, illegal possession, or attempted sale of the material. At the same time, non-proliferation and de-

⁴⁷ Richard Falkenrath et al. *America’s Achilles’ Heel* (Cambridge, MA: MIT Press, 1999), 28.

⁴⁸ International Atomic Energy Agency, “The IAEA Illicit Trafficking Database (ITDB),” http://www.iaea.org/NewsCenter/Features/RadSources/fact_figures2004.pdf, 2004.

proliferation are two different constructs and attitudes with regards as to how to handle the nuclear question, to go or not to go nuclear. States motivated by their own interests, such as the case today with North Korea and Iran, only add to the growing potential for continued proliferation problems in the future. The case where a transnational criminal network meets a terrorist network may not be too far off.

3. The First Nuclear Black Market

By the early 1970's, Pakistan faced a strategic dilemma when India, Pakistan's key adversary, divided Pakistan into two by recognizing Bangladesh. In 1965, Pakistan's foreign minister at the time declared that "If India builds the bomb, we will eat grass or leaves, even go hungry, but we will get one of our own."⁴⁹ An arms race in South Asia ensued. By 1987, Pakistan was able to produce a nuclear weapon. In between rose a network of financiers, importers and front companies orchestrated by the A.Q. Khan who led the creation of Pakistan's nuclear program.

His international network provided a unique sophisticated service that combined the proliferation of highly sensitive technology with the knowledge, skill, and ability to allow a country to jump start the development of its nuclear weapons program.⁵⁰ In recent reports, one Pakistani official publicly admitted that A.Q. Khan sold "crucial" equipment such as centrifuges, a crucial component used to enrich uranium and produce fissile material for nuclear warheads.⁵¹ While there's been no direct link to connect A.Q. Khan with selling nuclear or fissile technology to non-state actors, the proliferation and existence of franchised version of the nuclear "Wal-Mart" cannot be discounted. Yet, if we are

⁴⁹ Christopher Clary. "Dr. Khan's Nuclear Wal-Mart," *The Acronym Institute for Disarmament Policy*, March/April 2004, <http://www.acronym.org.uk/dd/dd76/76cc.htm> (accessed March 17, 2005).

⁵⁰ George J. Tenet, "The Worldwide Threat 2004: Challenges in a Changing Global Context," *Testimony of Director of Central Intelligence before the Senate Select Committee on Intelligence*, Feb 24, 2004, http://www.cia.gov/cia/public_affairs/speeches/2004/dci_speech_02142004.html (accessed March 17, 2005).

⁵¹ Paul Haven, "Pakistan Admits Rogue Scientist Aided Iran," *Guardian Unlimited*, March 10, 2005, <http://www.guardian.co.uk/world/latest/story/0,1280,-4856447,00.html> (accessed March 17, 2005).

to compare the proliferation of fissile technology with other black markets, it is not too unrealistic to assume that other proliferation networks may take on the lessons learned and seek to start up their own program of their own. For now, we can only assume that the vestiges of what was once a thriving network has at best gone underground and attention continues to focus on A.Q. Khan in discovering the extent of his network. However, it is important to note that the conditions and permissive environment to which Dr. Khan exploited in support of his network may be difficult to repeat anew. For example, the global community has become more attuned to such possibilities and has responded by adopting such measures as the Proliferation Security Initiative.⁵² Yet, as discussed with an official from the Lawrence Livermore National Laboratory, Dr. Zachary Davis, a strong possibility exists that individuals who were once junior players during the peak of A.Q. Khan's nuclear black market are today seeking financial gain and profiteering through similar means.⁵³

D. IN PURSUIT OF THE BOMB

For a terrorist group to say that it wants to acquire a weapon of mass destruction such as a nuclear weapon is one thing, but to follow through would require a great deal of planning and preparation. During the inquiries for the 9/11 Commission, expert witnesses testified to the plausibility of a nuclear attack on the United States. For example, in his testimony, renowned terrorism expert Dr. Magnus Ranstorp, stated that:

The prospects of an attack against one of our nuclear facilities, rendering vast geographical or economic centers uninhabitable for hundreds of years, are no longer fiction but a possible future apocalyptic reality. Above all, the September 11th showed that when globalization meets extremist violence anything is possible for the future with threats of violence that can occur anywhere and

⁵² NOTE: The Proliferation Security Initiative or PSI will be discussed in more detail later.

⁵³ NOTE: Author's notes and discussions during the "Globalization and WMD Proliferation Networks" Conference held at Naval Postgraduate School 29 June – 1 July 2005. Additional reports on South African "Nuclear Underground" available at pbs.org's Frontline on-line news information. See <http://www.pbs.org/frontlineworld/stories/nuclear/> for more information.

anytime within our homelands with incalculable and unimaginable consequences.⁵⁴

Given the level of proliferation that exists and the strong possibility or inevitability of a nuclear North Korea and Iran, one must closely examine the plausibility. As the U.S. currently finds itself engaged in operations in Iraq and Afghanistan, hostility towards the United States from the Islamic community remains high.⁵⁵ Captured papers in the mountains of Afghanistan revealed plans by al Qaeda and the Taliban to pursue nuclear weapons. No materials were found by the intent demonstrated a significant amount of nuclear weapons effort.⁵⁶

If al Qaeda or any other terrorist group for that matter were to recruit the proper skill sets, how difficult would be to make a basic nuclear weapon? The following section will serve as basic primer to understand the major components of a nuclear bomb as well as the characteristics of a nuclear bomb. The analysis presented will serve as a primer on the nuclear bomb as true weapon of mass destruction that is distinct from a weapon of mass disruption or “dirty bomb.”

1. The Making of a Nuclear Bomb

The key component in a nuclear weapon is fissile material. Fissile matter is the key ingredient within a nuclear bomb that is made-up of atoms capable of splitting and fusing together at a tremendous rate. The process of splitting and fusing together creates a vast amount of energy which occurs within a small fraction of a second before the central core of nuclear material is blown apart.⁵⁷ As Circincione explains, “To create a chain reaction, the core of nuclear material

⁵⁴ Magnus Ranstorp, “Statement of Magnus Ranstorp,” *The Commission on Terrorist Attacks Upon the United States*, March 31, 2003, http://www.9-11commission.gov/hearings/hearing1/witness_ranstorp.htm (March 2, 2005).

⁵⁵ Edward Djerejian, “Changing Minds, Winning Peace: A New Strategic Direction for U.S. Public Diplomacy in the Arab & Muslim World,” *U.S. Department of State*, October 3, 2003, <http://fpc.state.gov/fpc/24885.htm> (March 5, 2005).

⁵⁶ David Albright, “Al Qaeda’s Nuclear Program: Through the Window of Seized Documents,” *The Nautilus Institute*, November 6, 2002, http://www.nautilus.org/archives/fora/Special-Policy-Forum/47_Albright.html (accessed March 22, 2005).

⁵⁷ Cirincione, *Deadly Arsenals: Tracking Weapons of Mass Destruction*, 37.

must be formed into a critical mass, meaning that enough fissionable material is in a sufficient small area to enable a self-sustaining fission” to occur.⁵⁸ The level of purity of the fissionable material will determine the amount necessary for a nuclear bomb. In other words, if a certain amount of weapons grade fissile material is 50% pure, more is required than compared to the same amount of material at 90% purity. The International Atomic Energy Association (IAEA) considers 25 kilograms of highly enriched uranium and 8 grams of plutonium as highly significant. Uranium 233 (U-233), Uranium 235 (U-235), and Plutonium-239 (Pu-239) are categorized as weapons grade fissile material with U-235 and Pu-239 serving as the primary material used to develop nuclear weapons. Of the fissile material, only U-235 is found in nature but with a concentration level of about 0.7%. In preparation for a nuclear bomb the fissile material must undergo an enrichment process. U-233, Pu-239, and other radiological material must be created artificially in a nuclear reactor or re-processing facility.

The process for producing highly enriched uranium (HEU) or weapons grade Pu-239 is complicated and requires multiple steps, facilities, and technical capabilities. States wishing to obtain HEU would either have to purchase these materials or by-pass international restrictions that prohibit nuclear explosions in order to build an independent capability. To do so would require specific enrichment technology developed indigenously or obtained illegally. Most exporters of nuclear materials would be less inclined to sell such material unless they were to be used for peaceful purposes, such as nuclear energy.⁵⁹ That is why the proliferation of such technology by A. Q. Khan and his network was so significant. As an example, the following is a list below gives a snapshot of some of the items that would be required to make HEU.

⁵⁸ Cirincione, *Deadly Arsenals: Tracking Weapons of Mass Destruction*, 37.

⁵⁹ International Atomic Energy Association (IAEA), “The Treaty of Non-Proliferation of Nuclear Weapons,” International Atomic Energy Association, June 12, 1968, Article IV, paragraph 2, <http://www.iaea.org/Publications/Documents/Treaties/npt.html> (accessed March 23, 2005).

- Uranium deposits
- Uranium Mine
- A uranium mill (for processing uranium ore)
- A conversion plant (used to process and purify materials)
- An enrichment plant (to enable purified materials to be processed at a weapons grade level)
- A capability of converting gases and other chemicals into solid uranium oxide or metal⁶⁰

The process for Pu-239 entails additional infrastructure and technical requirements such as a power reactor moderated by heavy water or graphite.

In terms of making a nuclear weapon, the most basic design is the gun-type, the type used over Hiroshima, is made from firing a projectile of HEU down a gun barrel against another piece of HEU creating a critical mass that leads to a chain reaction that causes a nuclear explosion. The figure below depicts the basic concept of a gun-type bomb.

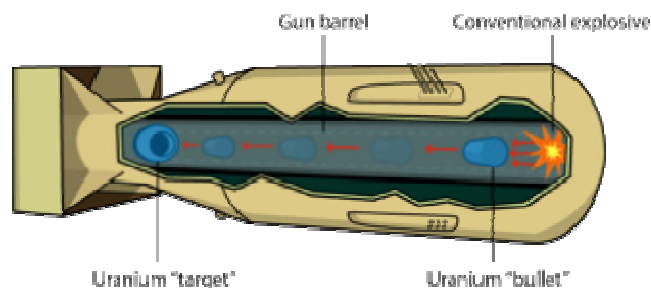


Figure 2. Gun-Type Nuclear Bomb⁶¹

The main advantage of the gun-type nuclear bomb is in its simplicity providing the user with a high degree of confidence that the weapon will perform as intended.⁶² In fact, Hans Bethe, a technical expert on the Manhattan Project whose bombs were dropped over Japan during World War II, stated that the basic principles of a gun-type bomb were “well taken care of” by one scientist

⁶⁰ IAEA, “The Treaty of Non-Proliferation of Nuclear Weapons,” 35-43.

⁶¹ DictionaryLaborLawTalk.com, “Nuclear Weapon Design,” 2004, http://encyclopedia.laborlawtalk.com/Nuclear_weapon_design (March 23, 2005).

⁶² Graham Allison et al. *Avoiding Nuclear Anarchy* (Cambridge, MA: MIT Press, 1996), 55-60.

and two of his graduate students during a summer study at Berkeley.”⁶³ However, this design is only effective for uranium-based weapons and will not work with plutonium-based weapons.

A second but more sophisticated method is the implosion device. The implosion device is designed to compress a collection of subcritical sphere of nuclear material equally into a sphere sufficiently small to create a critical mass. The idea is similar to attempting to turn a basketball into a baseball with explosives.⁶⁴ While the design may be more technical, it is, however, more efficient and allows for a more compact weapon to be utilized requiring less fissile material. For comparative purposes, an HEU implosion requires “only 30 pounds of HEU to match the 15-kiloton yield of Little Boy⁶⁵. Because plutonium is a more efficient fissile material than HEU, only 12 pounds was necessary to give Fat Man⁶⁶ a 20-kiloton yield.”⁶⁷ Unlike the gun-type which is limited to U-235 only, implosion devices can be used for either U-235 or Pu-239. A graphic representation is depicting the various stages before detonation and after detonation is provided in the figure below:

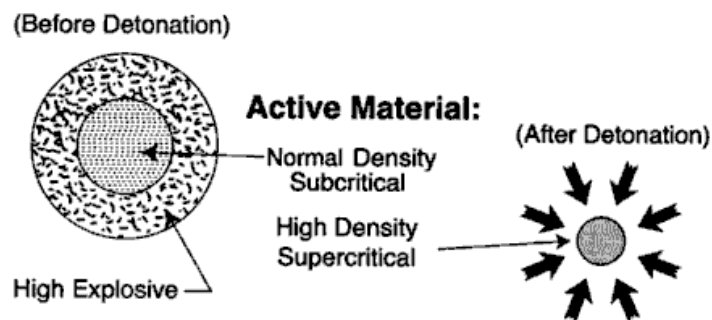


Figure 3. Implosion Design⁶⁸

⁶³ John Holdren and Mathew Bunn. "Technical Background: A Tutorial on Nuclear Weapons and Nuclear Explosive Materials," November 25, 2002, http://www.nti.org/e_research/cnwm/overview/technical.asp (accessed March 22, 2005).

⁶⁴ Cirincione, *Deadly Arsenals: Tracking Weapons of Mass Destruction*, 37.

⁶⁵ NOTE: A gun-type bomb that was dropped over Hiroshima, Japan during World War II with a yield equal to 15,000 tons of TNT, or 15 kilotons.

⁶⁶ The bomb dropped over Nagasaki during World War II is an example of an implosion bomb.

⁶⁷ Allison et al., *Avoiding Nuclear Anarchy*, 59-60.

⁶⁸ DictionaryLaborLawTalk.com, "Nuclear Weapon Design," part 3.

As stated previously, the International Atomic Energy Association considers 25 kilograms of highly enriched uranium and 8 grams of plutonium as highly significant. The U.S. Department of Energy (DOE) states that only 4 kilograms of plutonium and as little as 15 kilograms of highly enriched uranium is all that's needed to produce a basic nuclear weapon. In an implosion design would make maximum use of less material and, theoretically, you would be able to combine U-235 and Pu-239 to achieve a nuclear explosion. Other methods to weaponize fissile material exist but entail greater sophistication and resources. The gun-type and implosion designs are some of the most publicized, the best known, and most probable. Yet, according to Falkenrath et al, former weapons designers and experts in this field believe that small non-state actors could design simple explosive devices out of improvised materials to include uranium or plutonium oxides. Likewise, arguments against the possibility of a non-state actor building a nuclear weapon are inclined to concentrate on the difficulties associated with implosion designs of the delivery and size of the weapon, issues for which a group building a basic gun-type weapon may not necessarily be concerned.⁶⁹

According to David Albright, former United Nations nuclear weapons inspector, "There is no indication that al Qaeda's nuclear work has gone beyond theory. To create a nuclear weapon...a designer must learn a whole set of manufacturing steps not mentioned in al Qaeda's manual and develop confidence in the weapon's design."⁷⁰ However, the level of public knowledge about the various nuclear weapon designs has been available for at least 50 years. In fact, the simplest nuclear design, the gun-type weapon, has continued to be used in various ways. Before dismantling its nuclear program, South Africa had used this basic design and expected to gain a 10-18 kiloton yield if used.⁷¹ Additionally, the proliferation of knowledge and capability has continued to

⁶⁹ Falkenrath et al., *America's Achilles' Heel*, 162.

⁷⁰ David Albright et al. "Bin Laden and the Bomb," *Bulletin of Atomic Scientists* 58, no. 01, Jan/Feb 2002, http://www.thebulletin.org/article.php?art_ofn=jf02albright_027 (July 23, 2005).

⁷¹ Allison et al., *Avoiding Nuclear Anarchy*, 59.

expand and as technology improves the efficiency in which weapons are made, the “know how” of such capability will require less and less in-depth knowledge. For example, al Qaeda operatives did not necessarily need to learn how to take-off and land a major jet liner; instead they simply needed to know how to control and navigate the aircraft while airborne. The same principle may be applied to nuclear weapons that are missing and unaccounted for. A little knowledge can go a long way.

2. Acquiring a Nuclear Weapon

As some experts have argued, for a terrorist group to make a nuclear bomb, it would require the assistance of individuals with experience in the design and construct nuclear weapons. However, in the case of a gun-type of bomb, in-depth knowledge may not be a pre-requisite. According to Holden and Bunn, it is conceivable that a team of 3 to 4 people, with a solid, basic knowledge of physics, machining, explosives, and the chemical and physical attributes of the nuclear material using unclassified literature could, possibly, manufacture a nuclear bomb from weapons-grade material, without the need of prior nuclear weapons experience.⁷² However, acquiring all the material and expertise would still remain a challenge and given the complexity and infrastructure necessary, the most likely path for a terrorist group is to steal or buy a nuclear weapon vice developing an indigenous capability. This fact alone demands a greater need for cooperative efforts to secure weapons to avoid and mitigate the probability of theft by potential terrorists.

The three most widely accepted approaches are that terrorists groups may buy, steal or make the components that comprise a nuclear bomb. However, as Falkenrath, Newman, Thayer point out, there are some key points that make acquisition of nuclear weapons possible:

⁷² John Holdren and Matthew Bunn. “Technical Background: A Tutorial on Nuclear Weapons and Nuclear Explosive Materials – Part Two.” November 22, 2002, http://www.nti.org/e_research/cnwm/overview/technical2.asp (accessed March 22, 2005), para 12.

First, all of the scientific information necessary to design a simple nuclear weapon is publicly available. Second, the increased possibility of stealing, or acquiring it from smugglers, has lowered the most significant technical barrier to nuclear weapon acquisition. Third, with a sufficient quantity of pure HEU in metallic form, nuclear weapons design and construction required only limited resources, equipment, and expertise, and could be accomplished by many states and a few exceptionally capable non-state actors. Fourth, although building nuclear weapons with plutonium and non-metallic or impure HEU would present greater technical challenges, it could be accomplished by many states, and would be possible for some non-state actors. Finally, although an active effort to obtain fissile material exposes nuclear aspirants to considerable risk of detection by law enforcement and intelligence agencies, the clandestine fabrication of a nuclear weapon has few distinctive, easily observable indicators.⁷³

To summarize the potential avenues a terrorist group may pursue in its effort to acquire nuclear weapons or radiological material, the following matrix highlights key issues and concerns:

⁷³ Falkenrath et al., *America's Achilles' Heel*, 126-137.

Acquiring a Nuclear Weapon			
	<i>Tech Knowledge</i>	<i>Resources</i>	<i>Risk Factors</i>
<i>Buy</i>	<ul style="list-style-type: none"> - Low if weapon is bought in its entirety. - Low if major components are complete to assemble a gun-type weapon. 	<ul style="list-style-type: none"> - Sufficient Finances - Access to individual or group willing to sell - Desired path for a terrorist org 	<ul style="list-style-type: none"> - In general, low but need someone willing to sell -Susceptible to “honey point” stings
<i>Steal</i>	<ul style="list-style-type: none"> - Medium to High: Must have insider knowledge or ability to exploit security vulnerabilities 	<ul style="list-style-type: none"> - Insider knowledge and access to targeted facility - Next best option for terrorist organization 	<ul style="list-style-type: none"> - Must overcome security measures to obtain materials, a daunting task in most cases.
<i>Make</i>	<ul style="list-style-type: none"> - Highest among all potential options - Requires ability to discern weapons grade material from radioactive material 	<ul style="list-style-type: none"> - Finances & technical expertise - May require multiple sources for ingredients - Most difficult for terrorist organization 	<ul style="list-style-type: none"> - Components generally difficult to acquire - Requires multiple skill sets/knowledge - Vulnerable/dependent on technical experts

Table 3. Comparative Approaches of Acquiring a Nuclear Capability.⁷⁴

Analyzing the chart further, one asks the question which path would terrorists most likely pursue? In the following chapter the case studies involving Aum Shinrikyo and al Qaeda depicts the how both groups have attempted to acquire such a capability and each group, particularly Aum Shinrikyo has attempted to pursue each avenue above more specifically, in buying or making a nuclear weapon. For the purpose of this study, the most ideal way for a terrorist is to buy or steal a nuclear weapon intact. However, stealing a weapon requires a great deal of intelligence and insider knowledge of the security system involved. Buying a weapon would also be just as challenging in that a terrorist

⁷⁴ Author's matrix based on a selection of readings.

group must be able to trust the network, group, or individual from whom they plan to purchase the weapon from to ensure that what they have is real and not a hoax. Al Qaeda has experienced at least one instance in which millions were spent on purchasing a weapon that turned out to be false.

The last of the three options to make their own weapon is the most difficult and would require sufficient amount of weapons-grade material. In this case, a gun-type weapon would be the most simple of the designs. If weapons-grade material such as highly-enriched uranium or plutonium is unavailable the process of enriching the uranium in itself is daunting and would be the least likely. In sum, the likelihood that a terrorist may take in attaining a nuclear capability would be as follows: (1) steal or buy weapons grade, highly enriched uranium or plutonium and develop a gun-type bomb; (2) steal or buy a nuclear weapon intact; (3) make or develop enriched material and construct a nuclear weapon.

While the matrix in Table 3 concerns itself with the three ways in which terrorists may acquire a nuclear weapon, a fourth possibility of sympathizers providing a nuclear weapon to terrorist organizations must also be considered. According to Amitai Etzioni, professor of Sociology at George Washington University, "Pakistan ranks high as a state from which terrorists are most likely to be able to obtain ready-made nuclear weapons either by toppling its government, by cooperating with certain dangerous elements of the government, or by corrupting the guardians of the bombs."⁷⁵ As reported in a recent RAND study, suspicions that bin Laden had managed to recruit "pious scientist" from Pakistan's nuclear program was reported in the media.⁷⁶ The study quoting press reports, believed that scientists may have provided al Qaeda with a road map for building a nuclear bomb by naming key technology and suppliers willing to support the group's effort.⁷⁷ Suspicions persist that scientists, sympathetic to

⁷⁵ Amitai Etzioni, "Pre-empting Nuclear Terrorism in a New Global Order," *The Foreign Policy Center*, UK, October 2004, <http://www2.gwu.edu/~ccps/PreemptNucTerr.pdf> (accessed on 12 August 2005), 12.

⁷⁶ Sara Daly, John Parachini, and William Rosenau, *Aum Shinrikyo, and the Kinchasa Reactor*, (Santa Monica, CA: RAND, DB-458-AF, 2005), 35.

⁷⁷ *Ibid.*, 35

al Qaeda's cause may have fled to southeast Asia to avoid questioning.⁷⁸ The issue of de-proliferation among failing states while prohibiting new state to enter the nuclear club must also serve as a central issue for policy-makers to consider. The fourth option where an insider may provide or give a terrorist organization a nuclear weapon may easily shoot to the top as a likely scenario.

E. U.S. STRATEGY AND POLICY

The knowledge gained from understanding the extent of A.Q. Khan's network is critical in our development of effective counterproliferation strategies. U.S. policy and strategy must be prepared to respond to underground networks who like transnational terror networks may very well have become more diffused and dispersed.⁷⁹ The current national security strategy (NSS) acknowledges the need to give greater attention to global cooperation to meet current challenges. The NSS identifies three key pillars to U.S. Policy and Strategy: (1) *counterproliferation to combat WMD use* ~ reflects a domestic defensive posture to deter and defend the U.S. from attacks; (2) *strengthen non-proliferation to combat WMD-proliferation* ~ a strategy that concentrates U.S. efforts to working traditional methods of diplomacy, arms control, multilateral agreements, export control, and threat reduction efforts; in here we see the use support for the Nuclear Proliferation Treaty and the most recent initiative Proliferation Security Initiative (PSI);⁸⁰ (3) *consequence management to respond to WMD use* ~ designed to put the onus on the U.S. government to prepare its citizens, military forces, and allies with the ability to respond in case of an attack.⁸¹ As a whole,

⁷⁸ Sara Daly et al, *Aum Shinrikyo, and the Kinchasa Reactor*, 13.

⁷⁹ John Arquilla et al., "Chapter 3: *Networks, Netwar, and Information-Age Terrorism*" in *Counter the New Terrorism*, Ian Lesser et al. (Santa Monica, CA: RAND, 1999), 46.

⁸⁰ Sharon Squassoni. "Proliferation Security Initiative," *Library of Congress*, Congressional Research Service, Order Code RS 21881, (January 14, 2005): 3. NOTE: PSI was signed in May 31, 2005 and is designed to work with other participating nations to interdict shipments of WMD. According to the report, 17 countries are signatories to the agreement with as many as 60 nations willing to support the initiative. The major criticism of the program is the difficulty to measure effectiveness of the agreement. In April 04, the UN Security Council passed a resolution that strengthened the agreement requiring all states "to criminalize proliferation, enact strict export controls and secure all sensitive materials within their borders." Once again, the challenge falls on nations willing to enforce such actions.

⁸¹ George Bush. "National Strategy to Combat Weapons of Mass Destruction," US Department of State, December 2002, <http://www.state.gov/t/np/wmd/> (March 17, 2005), 2.

this broad policy identifies the defensive characteristics of protecting the nation, but widening its scope to address the causes for terrorism should also be expanded upon.

In the most recent National Defense Strategy signed by Secretary of Defense Donald Rumsfeld on 1 Mar 05, the Secretary states that the DoD “will place greater emphasis on those capabilities that enable us to dissuade others from acquiring catastrophic capabilities, to deter their use and, when necessary, to defeat them before they can be employed.”⁸² In executing these tasks, the Secretary emphasizes dissuading potential adversaries, deterring aggression and the use of counter coercion. In the document, a continuing emphasis is placed on al Qaeda’s terror network; but the author believes that broadening the target set to expand beyond al Qaeda to include proliferation and supply networks may yield greater results towards mitigating the threat of nuclear terror. With so much focus on Osama bin Laden and al Qaeda, other potential terror groups remain underground. The same can be said about A.Q. Khan. With so much emphasis on the Pakistani scientist, other potential “franchised” proliferators may be operating and continuing where A.Q. Khan left off.

Finally, according to *The National Defense Strategy of America*, continuing multilateral negotiations will help to deal with counterterrorism in three ways:

First, in a few cases a multilateral resolution can provide a formal structure for making demands and implementing responses without the taint of being solely the work of the United States, or the United States and a few allies.... A second and less specific way...is that they reinforce and international norm against the use of terrorism.... (Through the use of international conventions, multilateral negotiations) provide common standards that facilitate cooperation on certain matters.⁸³

⁸² Donald H. Rumsfeld. “The National Defense Strategy of America,” US Department of Defense, March 05, <http://www.defenselink.mil/news/Mar2005/d20050318nds1.pdf> (March 22, 2005), 3-4.

⁸³ Paul Pillar. *Terrorism and U.S. Foreign Policy*, (Washington, D.C.: Brookings Institute Press, 2001), 76-78.

To resolve group level problems we need to view it from a group level or movement level perspective. It is at that point that we can start crafting more tailored solutions to resolve counter extremist threat. Policy-makers engaged in a rational actor or structuralist framework must adapt to multi-dimensional aspects in meeting today's challenges, specifically as they pertain to mass terror. As Dr. Mohammed Hafez, Professor of Political Science at University of Missouri and specialist in Islamic revivalism, cites the delicate balance of the western response and reaction to Islamist violence. He believes that "misconstruing the underlying causes of Islamist rage or overacting to Islamist violence may only intensify militancy, not temperate it."⁸⁴ As such, U.S. policies must continue to emphasize multilateral efforts to work with countries, not against them, in dealing with internal challenges.

F. SUMMARY

In summary, the coercive potential of a nuclear or radiological bomb makes the threat of nuclear terror distinct from other forms of what is generally accepted as weapons of mass destruction. As stated by Ashton Carter, makes the potential for mass-destruction greatest when compared to lesser or more limited destructive capacities. As Carter states, "The primary focus of counterproliferation policy, therefore, should be nuclear and biological weapons."⁸⁵ Low-end weapons such as a radiological dispersal device or "dirty bomb," while not requiring substantial effort to develop, would have a more limited overall effect in and would serve more as a weapon of disruption rather than a weapon of mass destruction.

On the other hand, if terrorists were interested in creating a catastrophic effect by using a true weapon of mass destruction, a terrorist would opt to pursue

⁸⁴ Mohammed Hafez. *Why do Muslims Rebel: Repression and Resistance in the Muslim World*, (Boulder: Lynne Rienner Publishers, 2003), 199.

⁸⁵ Ashton Carter, "How to Counter WMD," 73. NOTE: While the scope of the thesis is focused on the nuclear terror, the threat of biological terror is one of grave matter with the potential to cause mass casualties. The author concurs with Mr. Carter on the idea that weapons of mass destruction should be limited to the threat of nuclear and biological terror; however, the study of biological terror is beyond the scope of this thesis.

a nuclear weapon.⁸⁶ The most likely path for a terrorist to obtain a nuclear device would be to steal or purchase the fissile material necessary to make a basic nuclear bomb. Another concern is for a terrorist network to work with an insider threat to purchase a nuclear warhead from a country exploiting security vulnerabilities. For example, U.S. officials are concerned about Pakistan where extremists have attempted to kill the country's President Pervez Musharraf on at least two separate occasions.⁸⁷

Beyond stealing a weapon, a terrorist group may consider purchasing a weapon or radiological material from a non-state actor. While a great deal of attention has focused on A.Q. Khan, one must also consider the possibility of other future variations of a new nuclear black market. Nations who have proven the ability to produce nuclear technology, such as South Africa, are prime to have future A.Q. Khan proliferators following in his footsteps. The case of Iran and North Korea are good example of customers who may have benefited from a network like A.Q. Khan.⁸⁸ In contrast, for a terrorist group to purchase a weapon from a state-actor would be unlikely, with the possible exception of North Korea, which is known to be willing to proliferate weapons, knowledge, and capability. Another potential avenue is the threat posed by transnational criminal networks. According to Phil Williams, noted criminologist and professor of International Affairs at the University of Pittsburgh, the threat posed by transnational criminal networks can take many forms. For example, Prof Williams believes that opportunistic amateur groups may be motivated by greed and the desire for profiteering from the sale of fissile materials while others like ethnically based smuggling groups may not have difficulty in obtaining to acquiring and concealing

⁸⁶ NOTE: While the author would still consider chemical and biological weapons as forms of mass disruption. However, the emerging threat posed by advances of biological and genetic mutations is enough to pause and consider. However, to date, such a threat has not presented itself on such a large scale, thus it remains a weapon of mass disruption.

⁸⁷ Adam Erli, "Pakistan: Assassination Attempt on President Musharraf," U.S. Department of State, December 29, 2003, <http://www.state.gov/r/pa/prs/ps/2003/27576.htm> (March 25, 2005).

⁸⁸ Bill Powell, "The Man Who Sold the Bomb," *Time Magazine*, February 14, 2005, <http://www.time.com/time/archive/preview/0,10987,1025193,00.html> (March 19, 2005).

radiological materials.⁸⁹ Finally, the least likely is for terrorists to gain the means to develop a weapon from scratch. To do so would, in all likelihood require state-sponsored support due to the resources necessary.

In closing, dealing with state-actors first is in the best interest of the global community. The second approach is to develop strategies that are targeted to disrupt and degrade proliferation and terrorist networks. The approach in dealing with both differs and these issues will be explored in Chapter IV. In addition, the debate between non-proliferation and de-proliferation must and should be reconsidered. The distinction between the two is critical in considering strategies that are preventive or pre-emptive in nature. That is, non-proliferation may have a preventive element in that states who have the ability refrain from proliferating to those states or non-states actors either wittingly or un-wittingly. At the end of the day, those states still have the potential to do so due to the fact that they possess the means. De-proliferation, however, requires a state to give up a nuclear capability thereby reducing the potential of states, or more specifically non-state actors, from acquiring fissile material in the first place. In return, states will have to address the core security issues that compel them to pursue nuclear weapons in the first place. Such an effort will require a regional focus and global focus with a concerted effort to reduce the overall potential for the fissile material available.

⁸⁹ Phil Williams and Paul Woessner, "Gangs Go Nuclear," *The World Today*, Dec 2000, Vol. 56, No. 12, 7-9. NOTE: In all, the authors list nine types of groups. In addition to the above, they also include: predatory criminal organizations: groups that engage in small cell activity usually confined to localized activities such as car theft extortion but without links to officials; sophisticated transnational criminal organizations~ the most diverse and extremely entrepreneurial in its approach to organized crime; criminal controlled business~ organizations where choke points such as border guards, custom official and other key crossroads are under their control; networks of former intelligence agents~ pertains more to ex-KGB; traditional mafia organizations~ may serve as key facilitators for transition between borders; finally, hybrid trafficking networks~ most difficult to identify and are considered more fluid and dynamic giving the network infinite variations and forms with appearance of any of the previous eight types of groups.

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III. CASE STUDIES OF EXTREMIST MOTIVATIONS FOR MASS DESTRUCTION

A. OVERVIEW

For policy-makers, understanding the source or cause of discontent serves as the best hope to remedy the ills that lie beneath what some refer to as “sacred” terrorism or religious terrorism. All too often, our analysis of extremist motives begins with our reaction to the terrorist act itself. However, for certain extremist organizations, channeling efforts to identify and isolate the root cause for such events requires a deeper understanding of the intricacies that foment such profound actions, specifically suicide terrorism and the use of a weapon of mass destruction. The effort is to better understand and compare the rationale behind the use of nuclear and radiological weapons. If terrorists can be deterred, the effort here is to determine which strategies or sets of strategies may prove more effective.

In a recent review by Jeff Goodwin of Jessica Stern’s *Terror in the Name of God*, he stated that few studies probe deeply into the cause of terrorism and, as a result, “it remains a mystery. A contributing factor is that social movement scholars with very few exceptions have said little about terrorism. Nor have they paid sustained attention to the more general question of how movement organizations make strategic choices, of which terrorism is one.”⁹⁰ As stated previously, to resolve group level problems one must observe such issues from a group or movement level perspective. It is at that point that we can start crafting more tailored solutions to counter the extremist threat. The purpose of this chapter is to examine the rationale behind terrorist use of weapons of mass destruction. A comparative analysis is presented through case studies of Aum Shinrikyo and al Qaeda. The objective is to analyze the rationale and extent of

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⁹⁰ Goodwin, “Review Essay: What Must We Explain to Explain Terrorism?” 259-265.

their actions in determining whether their effort to use nuclear or radiological weapons is one of strategic choice or group behavior.

In brief, Aum Shinrikyo's decision to attack civilians on a Japanese subway reflects an organization in a desperate fight for survival. According to Martha Crenshaw's organizational perspective, "terrorist actions often appear inconsistent, erratic, and unpredictable" and terrorist acts occur as a result of internal group dynamics.⁹¹ The group's ultimate decision to strike a Tokyo subway system was as much an attack on Japan's political culture as it was an act by a desperate group. In contrast, al Qaeda's methodical planning and extensive preparation reflects an instrumental approach where the act of terrorism is that of strategic choice founded on the basis of collective values. According to Crenshaw, such an organization ultimately fails when the group is unable to reach its political objectives or when the cost of conducting such terrorist acts exceeds any foreseeable benefits.

B. AUM SHINRIKYO

Today, evolving before the global community are fears of continued acts of "megaterrorism" such as the use of a weapon of mass destruction (WMD). Authors such as Graham Allison, Bruce Hoffman, Walter Laqueur, and others have written about the prospects of such actions. In fact, Thomas Schelling in 1979 wrote that "Sometime in the 1980s an organization that is not a national government may acquire a few nuclear weapons.... By 'organization' I mean a political movement, a government in exile, a separatist or secessionist party, a military rebellion, adventurers from the underground or the underworld, or even some group of people merely bent on showing that it can be done."⁹² Through his description, Schelling argues that distinctions exist between terrorist groups. If terrorist groups are distinctive in their motives, it would stand to reason that in order to deter or influence such organizations, one must also be able to isolate and differentiate the group's goals and objectives from their rhetoric. For

⁹¹ Martha Crenshaw, "Theories of Terrorism: Instrumental and Organizational Approaches," in *Inside Terrorist Organizations* edited by David Rapoport, 13, (New York: Columbia University Press, 1988) 27.

⁹² Schelling, "Thinking about Nuclear Terrorism," 61.

example, in comparing the Japanese terrorist cult Aum Shinrikyo to al Qaeda, we find distinctions in orientation and ideology, yet both are often characterized by the use of religious extremism to serve ideological objectives.

1. Background

Before the events of 9/11, Aum Shinrikyo unleashed fears of extreme terror with the release of sarin gas in a Japanese subway in 1995. Led by a religious mystic, Shoko Asahara, followers of the movement had come to believe that “Armageddon will come at the end of this century and...only a merciful, godly race will survive. The leader of this race will emerge in Japan.”⁹³ Asahara, characterized as charismatic, highly ambitious individual, methodically built a cult that, at its peak, reached 40,000 members world-wide with an estimated 30,000 followers in Russia and other areas to include Australia, Sri Lanka, and the United States.⁹⁴ The group capitalized on millennial visions and apocalyptic predictions to frame their group’s doctrine which was deeply influenced by the works of Nostradamus; his work serves as a cornerstone of the group’s teachings.⁹⁵ Aum’s followers actively recruited students and professionals in the fields of medicine, science, computers, engineering, and other technical areas. Asahara’s charisma and message seemed to have a great appeal to many who felt alienated by the industrialized, secular, and conformist aspects of Japanese society.⁹⁶

2. Motivation

At its peak, it is estimated that Aum Shinrikyo’s worth was as much as \$1.5 billion.⁹⁷ With such great financial resources, Aum Shinrikyo invested capital to support high-tech, state-of-the-art laboratories and funded its own

⁹³ David E. Kaplan and Andrew Marshall, *The Cult at the End of the World*, (New York: Crown Publishers, Inc, 1996), 12.

⁹⁴ David E. Kaplan, “Aum Shinrikyo,” in Jonathan B. Tucker’s *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (MA: MIT Press, 2000), 209.

⁹⁵ Kyle B. Olson, “Once and Future Threat?” *Centers for Disease Control and Prevention*, Jul/Aug 1999, www.cdc.gov/ncidod/EID/vol5no4/pdf/olson.pdf, 515.

⁹⁶ Sage Publications. “Aum Shinrikyo.” Sage Publications. Located at http://www.sagepub.com/Terrorism%20samples_2788.pdf, p. 1.

⁹⁷ Olson, “Once and Future Threat?” 514.

research circumventing restrictions normally associated with larger corporate research laboratories.⁹⁸ In addition to collecting monies through donations, tithing, and sales of religious materials, Aum conducted seminars and courses in the cult's teachings charging hundreds to tens of thousands of dollars to participate in these sessions. In fact, Aum Shinrikyo diversified its enterprises by running a chain of restaurants in Tokyo as well as owning a computer manufacturing firm that assembled and sold computers in Japan with parts imported from Taiwan.⁹⁹ Other more surreptitious practices included the manufacturing of illegal drugs that was supported by the Japanese mafia (the Yakuza) with a marketing agreement. Further, Aum engaged in a practice referred to as "green mail" where Aum would extort community leaders by threatening to establish a "branch" office or school within their local community. By engaging in such practices, the cult succeeded in gaining leverage through extortion, coercion, theft, and murder as a form of fund-raising for the cult.¹⁰⁰

Asahara and his closest followers planned to defend themselves against the coming Armageddon by creating a formidable arsenal that would enable Aum Shinrikyo to survive and become the most powerful group in the world. Despite high expectations and several attempts at local elections, Asahara and other leaders failed to gain a seat in the Japanese parliament. The result seemed to have radicalized the core leaders even more resulting from unmet expectations and the group's goals in changing Japanese political culture. He would later preach that it was "the duty of Aum members to hasten Armageddon" and subsequent efforts to attack the Japanese legislature also were indicative of Aum's disappointments with the democratic system.¹⁰¹

⁹⁸ Daniel A. Metraux, *Aum Shinrikyo's Impact on Japanese Society*, (New York: The Edwin Mellen Press, 2000), p. 78.

⁹⁹ Olson, "Once and Future Threat?" 514-515.

¹⁰⁰ Ibid., 515.

¹⁰¹ Sage Publications, *Aum Shinrikyo*, 1.

3. Opportunity

While the group's most notorious act involved the release of sarin gas, Aum attempted to acquire various types of other weapons to include biological, nuclear and radiological material. The cult's close relationship with followers in Russia positioned Aum Shinrikyo to leverage its vast wealth, contacts with Russian security forces, and dealers in the black-market yet failed to acquire weapons-grade fissile material.¹⁰² Aum remained open to all alternatives but in the end chose to develop chemical weapons. Yet, the cult's endeavors to acquire a nuclear capability were not without desire and effort. Aum invested a great deal of time and resources in its attempt to purchase advanced weapons. According to a recent RAND study, Hayakawa Kiyohide, a senior Aum leader, made eight trips to Russia in 1994 and with a budget of \$15 million sought to acquire a nuclear bomb.¹⁰³

Despite efforts to bribe senior Russian officials with exclusive access to foreign technologies markets, Aum failed in its quest to purchase a nuclear weapon.¹⁰⁴ Aum actively sought to recruit scientists and employees from Russia's Kurchatov Institute and Moscow State University to join the cult.¹⁰⁵ At one point, Aum leaders requested but were subsequently denied a meeting with the then Russian Energy Minister Victor Mikhailov to discuss the purchase of a nuclear warhead. Undaunted the group later pursued efforts to build a nuclear weapon by collecting required materials and mining uranium in Western Australia from land purchased by the group.¹⁰⁶ Their plan was to construct a bomb in Japan with plans to enrich the uranium by using lasers. Despite Aum's vast wealth and contacts Shoko Asahara and his followers eventually abandoned their

¹⁰² Gavin Cameron, *Nuclear Terrorism*, (Great Britain: MacMillan Press, 1999), 5.

¹⁰³ Sara Daly, John Parachini, and William Rosenau, *Aum Shinrikyo, and the Kinchasa Reactor*, (Santa Monica, CA: RAND, DB-458-AF, 2005), 13.

¹⁰⁴ *Ibid.*, 12.

¹⁰⁵ Gavin Cameron, "Terrorism and Weapons of Mass Destruction: Prospects and Problems," in *The New Terrorism* by Andrew Tan and Kumar Ramakrishna, (Singapore: Eastern Universities Press, 2002), 63.

¹⁰⁶ Cameron, "Terrorism and Weapons of Mass Destruction: Prospects and Problems," 63.

efforts to acquire a nuclear bomb and chose to pursue a less difficult, less costly option that was also less destructive.

Ultimately, Aum chose to pursue the chemical option and made several attempts with limited results between 1990 through 1995 leading up to the attack of the Japanese subway in Tokyo. Asahara and his core leaders would soon discover that, days prior to the subway attack, local authorities and law enforcement personnel had plans to conduct police raids against cult facilities and offices. However, until this point, Aum had succeeded in exploiting Japan's extensive legal protections for religious organizations which enabled Aum to operate in a highly permissive environment without much interference from the state.¹⁰⁷ By March 20, 1995, however, Aum's leaders realized that the case against their group by Japanese authorities was sufficient to its leaders. Asahara became convinced that his arrest along with other senior cult members was imminent and believed that the only strategy that remained was a pre-emptive attack to strike fear as a last act in order to ensure the group's survival. Despite having limited success in its previous efforts with chemical agents, Aum had believed that a successful attack would have sufficient psychological impact as to secure the group's future. In the end, what remains clear is that Aum displayed a great deal of resolve in its effort to employ tactics that would cause mass-casualties.¹⁰⁸

The perceived response by Japanese authorities compelled Asahara and his inner circle to go further underground. From Aum's perspective, this act improved the cult's chances for survival while reducing the likelihood of death or capture, particularly among the group's leaders. Going underground would isolate the movement from the outside world would limit the opportunity to add new recruits or replenish losses. Additionally, this action had the added effect of further radicalizing the group's tactics and ideology. As a result, Aum's behavior

¹⁰⁷ Author's notes from an interview with Prof Gunaratna during the week of 10-15 May 05 in Ottawa, Canada.

¹⁰⁸ Olson, *Once and Future Threat?* 515.

began to reflect the internal dynamics of the organization rather than the pursuit of a specific strategic objective.¹⁰⁹ The group began to develop a tight identity, social connections and interpersonal bonds that a sense of cohesion. It intensifies the group's resolve to move toward more violent activity.¹¹⁰ The organization's decision-making began to reflect the group's internal dynamics and group think eliminates decision within the leadership's inner core. Loyalty to the peer group took on a more profound meaning and an important motive as activists shifted toward a deepening commitment to the cause.¹¹¹ Survival was seen as at stake and the group became more willing to use extreme violence to counter any perceived threat to its existence.

4. Summary

Within the context of Aum's value system, the cult's actions appear logical. When faced with the real threat of capture by Japanese authorities, Aum's leaders had come to believe they had no other alternative but to strike. Despite previous failures, the group had committed itself to developing and using chemical toxins as their primary instrument of extreme violence. Arguably, however, Asahara's initial choice to pursue the development of nuclear weapons is owed more to the fascination in the use of technology than a rational decision to use lower cost alternatives. Ultimately, Aum, in terms of weapons of mass destruction, sought a less catastrophic alternative in using chemical weapons. By March 1995, Aum had believed it had no other option but to reject Japanese society and confront authority. Asahara had believed that his group's survival was at stake. One can argue that Aum sought an indirect approach to counter society's overwhelming preponderance of military and law enforcement forces by resorting to indirect methods. In failing to reach its goal of achieving political power through legitimate means, the group's leadership decided that a pre-emptive strike was their best and only option. In 2000, the group was renamed

¹⁰⁹ Crenshaw, "Theories of Terrorism: Instrumental and Organizational Approaches," 26.

¹¹⁰ Donatella Della Porta, *Social Movements, Political Violence, and the State*, (New York: Cambridge University Press, 1995), 157.

¹¹¹ Della Porta, "Introduction: On Individual Motivations in Underground Political Organizations," 3-28.

Aleph meaning to start anew, but has yet to relinquish its ties with Shoko Asahara. According to a *New York Times* article, when asked about its relationship with Asahara, Aleph's current leader Fumihiro Joyu, stated that "Just like you wouldn't stop your connection with physical fathers and mothers who commit a crime, we will not sever our connection with our spiritual father."¹¹²

C. AL-QAEDA

Similarly, one can draw parallels between Osama bin Laden and the development of antisystem frames used by al Qaeda to provide ethical justification for violence against civilians. For example, as previously mentioned Osama bin Laden's, manifesto *Jihad Against the Jews and Crusaders*, where he states his three major grievances with the United States; first, the presence of forces in Saudi Arabia; the second, U.S. Israeli alliance; third, corrupt Arab states whose failure to organize and inherent weakness allows for Israel to continue to exist.¹¹³ With the basic frame set, Osama bin Laden call for the jihad to be carried out the "far enemy."

1. Strategic Framing

By tapping into a view supported by a broad public, bin Laden attempts to draw support from among the greater Muslim community. His message strives to appeal to a wider global audience and rally a Muslim population of over 1 billion people to al Qaeda's cause. His effort is intended to reduce the psychological cost of participating in a radical cause or terrorist organization. In an article by della Porta, the author states that "The ideology of the terrorist organizations offered (1) a justification of political violence, including murder; (2) an image of the external world that masked the failures of the armed struggle; and (3) a positive evaluation of the role of individual action."¹¹⁴ Similar to Aum, al Qaeda has drawn from those sympathetic to its cause. Bin Laden has leveraged

¹¹² Jackie Fowler, "Aum Shinrikyo," (17 July 05), University of Virginia, <http://religiousmovements.lib.virginia.edu/nrms/aums.html>, (retrieved on 2 Sept 05).

¹¹³ Laqueur, "Voices of Terror," 410-419.

¹¹⁴ Della Porta, "Left-Wing Terrorism in Italy," in *Terrorism in Context*, edited by Martha Crenshaw, (University Park: Pennsylvania State University Press, 1995), 149.

common cultural frames and religious ones to serve as part of the group's strategic ideological objectives. Therefore, as with Aum Shinrikyo, one must distinguish and separate between religious and ideological factors that shape the group's short-term and long-term objectives.

Unlike Aum, however, al Qaeda's influence has extended to groups with known or alleged connections to al Qaeda including the Jemaah Islamiyah in Indonesia, Malaysia, and Singapore; Abu Sayyaf in the Philippines, al-Gama'a al-Islamiyya in Egypt; Harakat ul-Maujahidin in Pakistan; the Islamic Movement of Uzbekistan in Central Asia; Jaish-e-Mohammed in India and Pakistan; and, al-Jihad in Egypt.¹¹⁵ But the distinction between al Qaeda and its regional surrogate groups differ in that al Qaeda possesses a global view whereas the concerns by these various groups are more local. Likewise, these local groups have gone to considerable lengths to justify their support to the local population and would be less inclined towards resorting to mass violence. While they may agree that an attack on the U.S. is justified, a similar response locally would be counterproductive to the group's cause. Yet, to the extent that these corollary groups support al Qaeda directly or through more passive means, knowledge and understanding of the overall network is critical to determining the groups' vulnerabilities and potential opportunities to influence, deny, degrade, or disrupt threats of extreme violence.

Arguably, in the case of a group like al Qaeda, the framing of such religious zeal serves a useful purpose to promote the group's ideological objectives as well as justifying the use of collective violence.¹¹⁶ According to Hafez, "Muslims rebel because they encounter an ill-fated combination of political and institutional exclusion, on the one hand, and reactive and indiscriminate repression on the other. When states do not provide their Islamist opposition movements opportunities for institutional participation, and employ repression indiscriminately against these movements after a period of prior mobilization,

¹¹⁵ Audrey Kurth Cronin, "Behind the Curve," *International Security*, vol. 27, no. 3 (Winter 2002/03), 45.

¹¹⁶ Hafez, *Why do Muslims Rebel?* 200.

Islamist will most probably rebel.”¹¹⁷ Hafez describes how radical Islamists organize themselves and demand strict ideological and behavioral adherence of each of their members. In a similar way, Aum used threat, fear, murder, and intimidation to mitigate dissent within the group. This radicalized view, however, further isolates the organization from the rest of society.

2. Spiral of Encapsulation

The increased radicalization produces a “spiral of encapsulation” that gradually isolates Islamists rebels from the broader movement. That is, an organization whose continued isolation and increased radicalization causes the group to turn more extreme in their views thus becoming more fanatical or militant towards society at large. Such extremism increases moral justification for its cause while inducing a separation from the greater society. To be successful “Organizers of violence must align their tactics with cultural norms, symbols, and ethics that give moral meaning to acts of violence. Culture provides a “tool kit” of concepts, myths, and symbols from which militant organizations could selectively draw to construct strategies of action.”¹¹⁸ However, if a society places a premium on such sacrifice, cultural framing can succeed in intensifying and reinforcing extreme use of violence such as suicide terrorism. Thus, martyrdom and suicide terror becomes the weapon of choice for producing mass violence. Academics would argue that mass terror, like suicide terrorism, serves a strategic purpose and is considered a coercive tool by terrorist organizations. While nation-states apply the threat of economic sanctions and conventional firepower as a means of coercion, terrorists increasingly use suicide terror as the instrument of choice.¹¹⁹

Unlike Aum Shinrikyo, al Qaeda used a technologically conservative weapon combined with variants on a familiar tactic of hijacking, bombing, and

¹¹⁷ Hafez, *Why do Muslims Rebel?* 200.

¹¹⁸ Hafez, “Manufacturing Human Bombs: Strategy, Culture, and Conflict in the Making of Palestinian Suicide Terrorism.”

¹¹⁹ Pape, “The Strategic Logic of Suicide Terrorism,” 2.

martyrdom as suicide terror in a highly innovative way doctrinally.¹²⁰ Like Aum, al Qaeda expressed a strong interest and effort in acquiring weapons of mass destruction. In fact, bin Laden has called the acquisition of weapons of mass destruction (WMD) as a 'religious duty.'¹²¹ Ayman al Zawahiri, leader of the Egyptian Islamic Jihad (EIJ) expands bin Laden's views by stating that the objective of the global jihad against the United States and its allies is to:

- (1) To inflict maximum casualties against the opponent.
- (2) To concentrate on the method of martyrdom operations as the most successful way of inflicting damage against the opponent and the least costly to the Mujahedin in terms of casualties.
- (3) Targets as well as the type and method of weapons used must be chosen to have an impact on the structure of the enemy.
- (4) To reiterate that focusing on the domestic enemy alone will not be feasible at this stage.¹²²

3. In Pursuit of Weapons

Al-Qaeda's emphasis on the 'far away enemy' gave members of the World Islamic Front a common focus.¹²³ Yet despite al-Qaeda's effort to acquire CBRN materials, why have they not launched an unconventional attack using WMD? As reflected above, al-Qaeda's leaders had a strong desire to obtain unconventional weapons. In fact, al-Qaeda devoted an entire volume of their

¹²⁰ Cameron, "Terrorism and Weapons of Mass Destruction: Prospects and Problems," 53.

¹²¹ Matthew Bunn and Anthony Wier, "The Seven Myths of Nuclear Terrorism," *Current History*, vol. 104, no. 681 (April 2005), 154.

¹²² Marc Sageman, *Understanding Terror Networks*, (Philadelphia: Penn Press, 2004), 23.

¹²³ NOTE: In May 2003, al-Qaeda obtained a fatwa from a militant Islamic scholar from Saudi Arabia, Nasir bin Hamd al-Fahd, who stated that: Reuven Paz, "Yes to WMD: The First Islamic Fatwah on the use of Weapons of Mass Destruction," Prism Series of Special Dispatches on Global Jihad No. 1, accessed on 24 May 05 at <http://www.e-prism.org/images/PRISM%20Special%20dispatch%20no%201.doc>. See also, Carnegie Endowment's Resources on Terrorism, "A Fatwa on Using Nuclear Biological and Chemical Weapons against Infidels, located at <http://www.carnegieendowment.org/npp/terrorism.cfm>. Last accessed 25 May 05. "The attack against it (the United States) by WMD is accepted, since Allah said: 'If you are attacked you should attack your aggressor by identical force.' Whoever looks at the American aggression against the Muslims and their lands in recent decades concludes that it is permissible... They have killed about ten millions Muslims, and destroyed countless lands... If they would be bombed in a way that would kill ten millions of them and destroy their lands – it is obviously permitted, with no need for evidence."

5,000-page "Encyclopedia of Jihad" to methods by which chemical and biological weapons may be developed and constructed.¹²⁴

Like Aum Shinrikyo, Al Qaeda demonstrated evidence of intent and desire to self-develop highly destructive weapons. During operations in Afghanistan, US led coalition forces discovered traces of ricin and anthrax at five or six sites.¹²⁵ Additionally, evidence and video tapes were discovered demonstrating group's interest in bubonic plague, cyanide, and botulinum toxin which was also unearthed. The tapes included video-training manuals for terrorists instructing them on how to assemble explosive devices. The tapes also show chemical tests being performed on three dogs. In one scene, a group of unidentified men are seen leaving an enclosure in which the dogs are penned. A few moments later, a white gas appears to seep in from the left, when, after a few seconds, the dogs begins to display physical reactions.¹²⁶

According to a report prepared by the Center for Nonproliferation Studies, in January 5, 2003, seven men were arrested in London, UK for producing ricin in an apartment. British authorities indicated that at least one of the individuals arrested had attended an al-Qaeda training camp in Afghanistan. It was later discovered that the remaining individuals had undergone similar training in Chechnya and Georgia. Within a week, five more men and one woman were taken into custody for involvement in the plot.¹²⁷ Additionally, Abu Khabab who

¹²⁴ Kimberly McCloud, Gary A. Ackerman, and Jeffrey M. Bale, "Al-Qa`ida's WMD Activities," *Monterey Center for Nonproliferation Studies*, http://cns.miis.edu/pubs/other/sjm_cht.htm. (retrieved on 27 May 05).

¹²⁵ Audrey K. Cronin, "Terrorist Motivations for Biological and Chemical Weapons Use," Congressional Research Service, (28 Mar 03), <http://www.fas.org/irp/crs/RL31831.pdf>, 7.

¹²⁶ CNN, "Insights TRANSCRIPTS", show originally aired on 19 Aug 02, http://edition.cnn.com/TRANSCRIPTS/0208/19/i_ins.01.html retrieved at CNN's website on 12 May 05. NOTE: In 2002, CNN's Nic Robertson reported the discovery of over 250 videotapes prepared by al-Qaeda that was apparently found in a house where bin Ladin had stayed.

¹²⁷ Jeffery Bale et al, "Ricin Found in London: An al-Qa`ida Connection", (23 Jan 03), *Monterey Center for Nonproliferation Studies*, <http://cns.miis.edu/pubs/reports/ricin.htm> (retrieved on 25 May 05).

was a known al-Qaeda operative was identified as the man responsible for training members of the plot in London.¹²⁸

In April 2004, Jordanian authorities arrested 6 individuals and killed 4 in a raid to pre-empt a pending attack by small cell linked to Abu Musa al-Zarqawi who allegedly provided \$170,000 through messengers from Syria.¹²⁹ According to a witness testimony, suspects were found with instructions on preparing germ and conventional weapons.¹³⁰ The cell's plan was to conduct a suicide attack using trucks filled with 20 tons of industrial chemicals and explosives to crash into the Jordanian intelligence agency headquarters in the country's capital of Amman. The original plan called for simultaneous attacks against the U.S. Embassy as well as the prime minister's office. The estimated number of casualties were anywhere from as low as 20,000 up to 80,000 lives.¹³¹

Finally, in August 2004, 8 men were arrested in the UK and charged with "conspiracy to use weapons of mass destruction, providing material support and resources to terrorists, and conspiracy to damage and destroy buildings used in interstate and foreign commerce."¹³² They were discovered with information on chemicals, explosives, and radiological materials. Their plans were to target U.S. financial institutions to include the Citigroup Building in New York, the New York Stock Exchange, the Prudential Building in New Jersey, and the International Monetary Fund in Washington, D.C. The arrests occurred two weeks after a

¹²⁸ Shelia MacVicar and Henry Schuster, "European Terror Suspect got al-Qaeda Training, Sources Say," 6 Feb 03, <http://edition.cnn.com/2003/US/02/06/sprj.irg.alqaeda.links/index.html> (accessed 12 Jun 05).

¹²⁹ Nuclear Threat Initiative, "Details Emerge on Al-Qaeda Chemical Plot in Jordan," 27 Apr 04, http://www.nti.org/d_newswire/issues/2004_4_27.html, (accessed 10 Jun 05).

¹³⁰ Nuclear Threat Initiative, "Suspects in Jordan Terror Plot Had Instructions for Attack, Witness Say on Trial," 21 Apr 05, http://www.nti.org/d_newswire/issues/2005_4_21.html, (accessed 10 Jun 05).

¹³¹ BBC News, "Jordan Airs Attack 'Confessions'", 26 Apr 04, http://news.bbc.co.uk/2/hi/middle_east/3661495.stm, (retrieved on 22 May 05).

¹³² Steven C. Welsh, "United States Indicts Three British Nationals over Alleged Terrorist Plans to Attack U.S. Financial Targets," 14 Apr 05, CDI International Security Law Project, <http://www.cdi.org/news/law/uk-wmd.cfm>, (retrieved on 27 May 05).

series of 13 arrests of individuals allegedly affiliated with al-Qaeda network.¹³³ Those members arrested included Dhiren Barot (aka “Moussa al-Hindi” and Abu Esa al-Britani”), head of the al-Qaeda in Britain “who gets his orders directly from Osama bin Laden,” and Muhammed Naeem Noor Khan of Pakistan, “an alleged al-Qaeda operative” whose computer proved instrumental in the case.¹³⁴

4. Summary

In the three examples presented, we find certain common themes. First, the majority of the targets were selected for their symbolic value. In particular, the plot in Amman, involved the group’s plan for martyrdom/suicide attacks. The use of suicide terrorism was a strategic choice for maximum effect against a symbolic set of targets aimed at Jordan’s relationship with the United States. Second, in each case at least members had either trained with or received financial from al-Qaeda. Third, each assault was planned with the intent of having multiple simultaneous attacks.¹³⁵ Finally, as presented in the case of the terrorist plot in Amman, Jordan, small groups may resort to using conventional materials to achieve an unconventional effect.¹³⁶ These examples illustrate the prospect of independent cells conducting more diffused yet potentially lethal terrorist attacks. The most recent attacks against London’s citizens and transport system, only validates the continued use of such tactics. Most alarming, was evidence indicating that these attacks were carried out by British citizens.

¹³³ Welsh, “United States Indicts Three British Nationals over Alleged Terrorist Plans to Attack U.S. Financial Targets” NOTE: The other men identified included: Omar Abdur Rehman, Zia ul Haq, Abdul Aziz Jalil, Nadeem Tarmohammed, Moammed Naveed Bhatti, Quaisar Shaffi, and Junade Feroze.

¹³⁴ The Economist, “A Bigger Fish,” 5 Aug 04, http://www.economist.com/displayStory.cfm?story_id=3067985, (accessed on 17 Jun 05). Also see, Depart of Justice, (12 Apr 05), “Three British Nationals Indicted on Charges of Conspiring to use WMD, Providing Material Support to Terrorists,” last accessed on 17 Jun 05 at http://www.justice.gov/opa/pr/2005/April/05_crm_180.htm

¹³⁵ Brian Hoffman, “Presentation on al Qaeda to the New American Foundation,” 2 Dec 04, <http://newamerica.net/index.cfm?pg=event&EvelD=430>. NOTE: Dr Hoffman highlights al Qaeda’s ability to plan and ability to conduct multiple simultaneous attacks as one of al-Qaeda’s most potent threats.

¹³⁶ NOTE: According to recent testimony from Col Najeh al-Azzam of the Jordanian Intelligence Department: “An experiment was carried out in the desert in the presence of the Military Prosecutor Lt. Col. Mahmoud Obeidat where a cloud was formed which could have caused burns, paralysis of the breathing system and suffocation,” al-Azam said. “So the steps mentioned in al-Jayousi’s (the cell’s lead planner) confession were right 100 percent.” Posted on NTI website on 16 Jun 05 in article titled “Jordan Plot Suspect had Chemical Explosives,” retrieved from http://204.71.60.35/d_newswire/issues/2005_6_16.html on 20 Jun 05.

In sum, al-Qaeda's influence today appears to be more inspirational than tactical. Yet, the potential exists that new groups may "copycat" the tactics used by al-Qaeda. As John Parachini, a policy analyst for the RAND Corporation, points out, terrorist cells will exploit permissive environments that give extremists the opportunity to access and, in some cases, develop their own chemical weapons, the most accessible. As part of a state's counterterrorism effort states will have to become more aware that law enforcement regulations used to protect the individual rights may also be exploited by unscrupulous individuals.¹³⁷ Secondly, terrorists will still have to overcome technical challenges whether nuclear or chemical.¹³⁸ Since the crackdown of the Lashkar-e-Jhangvi (LeJ) in 2002 by Pakistani authorities, none of al-Qaeda's associated group appears to be developing chemical and biological weapons.¹³⁹ Finally, the leader's mindset and intent is critical. However, the individual cell leaders in the previous examples were not Shoko Asahara or Osama bin Laden. In order to survive, terrorist groups will be more independent or cellular in for and less command-driven by groups, a move influenced more by need than strategic intent.¹⁴⁰

If attacks do occur, they may be similar to the attempt in Amman, Jordan. Efforts would continue to focus on conventional material used and applied in an unconventional way. As Giles Kepel argues in his book *Jihad* written before 9/11, Islamic Fundamentalism was on a path of decline. If so, the events on

¹³⁷ John Parachini, "Putting WMD Terrorism into Perspective," *The Washington Quarterly*, Vol. 26, (Autumn, 2003) 26:4

¹³⁸ NOTE: In the case of nuclear weapons, the lack of knowledge has been considered one of the chief obstacles for terrorists in developing a nuclear bomb.

¹³⁹ According to a briefing by Prof Gunaratna, "Al-Qaeda-South Asia Links," slide 22, In 2002 stores of cyanide and other toxic chemicals, laboratory equipments in LeJ safe house in Karachi lends credence to the fact that Al-Qaeda operatives, working with the LeJ, moved its chemical stores and shipments of gold out from Afghanistan to reestablish operations from Pakistan. Other reports such as the one presented in NTI's 8 Oct 02 issue implied that a connection once existed involving chemical weapons and that Pakistani efforts to disrupt activity, at the time, was on-going. See http://www.nti.org/d_newswire/issues/2002/1/4/3s.html

¹⁴⁰ NOTE: John Arquilla, David Ronfeldt, and Michele Zanini, in "Networks, Netwar, and Information-Age Terrorism," in *Countering the New Terrorism*, ed. Ian O. Lesser et al. (Santa Monica, CA: RAND, MR-989-AF, 1999) p. 51, depict terrorist leadership as derived from a "set of principles (that) can set boundaries and provide guidelines for decisions and actions so that members do not have to resort to a hierarchy—they know what they have to do." To some the organization may "appear acephalous (headless), and at other times polycephalous (Hydra-headed)." Al-Qaeda has been described as essentially inspiring independent cells achieve broad goals and objects.

September 11, 2001 could be interpreted as an effort to resuscitate a dying movement. Future attacks may involve desperate acts to gain further fuel for the movement. As the President reconsiders a shift in its policy towards the global war on terrorism¹⁴¹ US objectives should be (1) to help its decline by means of non-proliferation/counter-proliferation in securing sensitive materials and mitigating the vulnerabilities of key areas and locations such as nuclear plants, ports, and large gatherings; and (2) simultaneously focus our effort to resolve the source of contention for the root causes for terrorism must ultimately find a resolution through non-kinetic multilateral/multidimensional means.¹⁴²

D. STRATEGIC CHOICE OR GROUP BEHAVIOR

Martha Crenshaw emphasizes the importance of analyzing how terrorist group behave as a key process in developing effective policy recommendations.¹⁴³ She develops two approaches to better understand terrorism and its consequences. The first approach argues that terrorism represents a strategic choice from a set of possible alternatives by a political actor. Behaving on a set of collective values, an organization may choose terrorism to achieve radical political and social change. This instrumental approach is viewed as a response to government behavior and actions. The corresponding view is that as cost for conducting such activity increases or as the reward for such actions decreases, violence will be less likely to occur. The instrumental perspective takes a basic rational approach of cost/benefit analysis in choosing terrorism.

The second approach emphasizes the internal organizational process within a particular group or across similar groups who have common objectives. The emphasis is on the internal dynamics of a group where leaders offer incentives to individuals or control their actions to discourage defection of dissent

¹⁴¹ Glasser, Susan B., (29 May 05), "Review May Shift Terror Policies," last accessed on 20 Jun 05 located at http://www.washingtonpost.com/wp-dyn/content/article/2005/05/28/AR2005052801171_pf.html

¹⁴² NOTE: By multilateral the author means either through direct support with regional state-actors and multidimensional to include diplomatic, economic, and informational means.

¹⁴³ Crenshaw, "Theories of Terrorism: Instrumental and Organizational Approaches," 14 and 25.

within the organization and foster intense loyalty. In effect, the actions of this type of group may not correspond to the organization's stated political objectives and more reflective of an erratic organization displaying unpredictable behavior showing more of a struggle of survival rather than activity that supports ideological objectives. Such a group would be more inclined to change internal incentives towards individuals in response to perceived threats from external pressures applied to the organization.

1. Similarities and Differences

How then would this apply to the Aum Shinrikyo and al Qaeda? The author will first compare the similarities of both organizations.

Similarities
<ul style="list-style-type: none"> • Amassed a great deal of wealth and financial resources • Global reach and access to external funds and support • Pursued efforts to purchase nuclear weapons and radiological materials • Strong interest and pursuit of WMD: well resourced/strong desires • Self-developed and experimented with chemical weapons; the easiest to make and the least deadly • Expressed political objectives and a call for change • Followers influenced by charismatic leadership • Discouraged by the state apparatus/desire for radical change • Operated within "permissive" environments • Followers were not of one specific class or social strata • Displayed ability to adapt and leverage existing technology

Table 4. Similarities between Aum Shinrikyo and Al Qaeda¹⁴⁴

With regard to weapons of mass destruction, the most telling comparison is the desire and financial resources to pursue chemical, biological, radiological,

¹⁴⁴ Author's assessment based on a collection of readings listed in this chapter.

or nuclear weapons. Both organizations believed that violence can achieve political change and both believed in the possibility that terrorism was an effective means to that end. However, as we compare the differences between both organizations, we begin to draw distinctions in their decision-making that reflects Crenshaw's original supposition regarding instrumental and organizational approaches.

Differences	
<i>Aum Shinrikyo</i>	<i>Al Qaeda</i>
<ul style="list-style-type: none"> • Manufactured/synthetic belief system • Used a chemical/biological weapons • Concentrated on WMD despite failures • Attacked from within • Reacting to pending strike • Remained in country of origin primarily • Relied on internal technical knowledge & expertise for WMD programs • Sought to mine & manufacture fissile material • Ran for political office and lost 	<ul style="list-style-type: none"> • Utilized pre-existing cultural and religious frames • Abandoned WMD and adapted a modified approach of proven tactics in a highly innovated way • Developed/tested chemical weapons • Attacked from afar • Comprised of members from an exiled community (Saudi Arabia, Egypt, etc.) • Relied on networked strategy to achieve effect • Sought external support for nuclear weapon • Demands on revamping the political system and secular construct

Table 5. Differences between Aum Shinrikyo and Al Qaeda¹⁴⁵

2. Observation and Analysis

Drawing from these conclusions, we begin to see the contrast between the organizations. While Aum expressed political change as their ultimate desire, its decision-making reflected more of an organizational survivalist construct in achieving its ends. Unlike al Qaeda, Aum became focused on using a weapon of terror to achieve its objectives. This obsessive fixation continued despite

¹⁴⁵ Author's assessment based on a collection of readings listed in this chapter. Monterey, CA.

numerous experimental attempts and failures. Aum's leaders appeared almost unconstrained by their own ego and driven to validate their extensive investment in research and equipment by using chemical weapons. In contrast, al Qaeda abandoned its effort only after repeated attempts failed to achieve desired outcomes leading the group instead to modify known capabilities, bombing and hijacking, with the intent to improve their chances of success. In keeping with a more instrumental approach, al Qaeda has maintained its focus on accomplishing its operational objective despite alternating the specific tactical means of doing so. Although al Qaeda had the wealth, resources, and contacts necessary for such a venture its leaders decided to pursue other alternatives to achieve the desired effect. However, what both examples show is that despite wealth and connections problems still exist in pursuing weapons of mass destruction.

A second key observation is the difference in how each organization framed its cause. Al Qaeda leveraged existing sentiments and feelings shared among a large majority of the Muslim world. The leadership within al Qaeda drew upon widely shared beliefs that the roots of the Muslim world's problem lie with the continuing influence of the West in Islamic affairs. His message had a broad appeal because it resonated with existing cultural, religious, and societal beliefs. Al Qaeda's leaders hijacked existing beliefs to satisfy ideological objectives. In contrast, Aum's belief core was wholly manufactured, i.e., synthetic in its origins. First, while Asahara dabbled in the practices of Hinduism, his syncretistic belief structure was pieced together out of various religious and non-religious beliefs, to include the writings of Nostradamus. Second, unlike individuals who are immersed in a predominantly Islamic culture, Aum Shinrikyo's teachings were not necessarily reinforced by everyday surroundings, societal contacts and interactions. Unless a follower of Aum lived in one of its communities, individuals were susceptible to external influences. To some degree, this constraint contributed to the need to suppress dissent within the group.

E. SUMMARY

The likelihood of terrorist use of weapons of mass destruction in the post-9/11 era remains unclear. However, the scale of attack on 9/11 suggests that despite the technical challenges, groups will continue to expend efforts in possessing a capacity to cause extreme violence whether through conventional or unconventional means. Increasingly, terrorism experts and specialists in social movement theory, suggest, more effort and dialogue between academic and government communities is necessary to understanding the role of extremism and source of contention behind groups that may spawn from social movements.¹⁴⁶ This would help policy-makers identify and distinguish groups who approach terrorism from an organizational or instrumental perspective.

Pressures applied to a group dominated by internal dynamics would compel the organization to implode by isolating the particular individual goals versus political ideology. This is best exemplified in the discussion of Aum Shinrikyo above. Within the context of Aum's value system, the cult's actions appeared logical. Their rejection of Japanese society is best illustrated in their preemptive response to pending raids by Japanese authorities. In lieu of achieving political power through legitimate means, the group ultimately sought to achieve its objective through extreme violence. In contrast, a group choosing terrorism among other alternatives will calculate actions based on perceived benefits and costs. This approach would suggest that presenting a set of different alternatives as substitutes or increasing costs to the degree that any benefits gained by terrorist in using extreme violence would not be sufficient to achieving political objectives.

In the case of al Qaeda, the pursuit of weapons of mass destruction was simply a part of the range of options available for instrumental purposes. Aum's obsession with WMD technology combined with the permissive environment of

¹⁴⁶ Notes by the author from conversations with Dr. Doug McAdam, a Stanford University professor of sociology, Dr. David Rapoport, a UCLA professor of political science and editor of the *Journal of Terrorism and Violence*, and Dr. John Arquilla, a professor of Defense Analysis at the Naval Postgraduate School during recent conference on held on 5-7 April 2005, at Naval Postgraduate School, Monterey, CA.

the Japanese legal system enabled Asahara's followers to pursue WMD technology despite numerous failed experiments. Today, changes in the legal system and law enforcement techniques would make the duplication of Aum's extensive WMD acquisition program more difficult. In other words, the changes adopted by Japan's legal system and experience gained from Asahara and his cult have raised the costs and risks of pursuing such tactics, thus mitigating the likelihood of replicating Aum's program in Japan.

Since the events on 9/11 and for groups who follow al Qaeda, an attack using chemical, biological, radiological, and nuclear weapons has yet to be seen. But, the potential is undeniable. Technical challenges will remain an issue in the short-run which will make conventional weapons applied in an asymmetric approach a primary means to cause mass disruption. As a result, the long-term goal should be continued emphasis on enforcing constraints and controls on the proliferation of sensitive materials to include commercially available fissile matter and not solely weapons-grade material. Experts contend that a radiological dispersal device (RDD) or "dirty bomb," a combination of both conventional explosives with low grade radiological material, is a greater threat than a nuclear weapon.¹⁴⁷ However, future terrorist groups may examine both cases and draw from them the next most probable course of action. For example, where Aum failed to hire the expertise necessary for a nuclear weapon's program, an instrumentalist group like al Qaeda may stand a better chance of recruiting Islamic extremists with the requisite skills.

Secondly, some argue that Islamist groups like al Qaeda are on their way out. If this is the case, what would preclude a group from following Aum Shinrikyo's model of resorting to extreme violence with the use of a more catastrophic weapon? In either case, the goal should be to aim towards eliminating a terrorist's hope for success by shoring up defenses and deterring the proliferation of WMD technology. Eliminate the means and you reduce the likelihood of a mass attack. Yet eliminating the means may serve as an effective

¹⁴⁷ Peter Zimmerman, "Dirty Bombs: The Threat Revisited," 1-3.

goal for a preventive strategy, it fails to address other approaches that can influence or effect other strategies such as pre-emption, deterrence, and coercive diplomacy. Denying the means is ineffective against terrorist who may already possess a nuclear or radiological weapon. As such, the following section will re-examine traditional strategies applied against states in an effort to redefine what it means to coerce, deter, pre-empt or prevent non-state actors from acquiring nuclear and radiological weapons.

IV. MITIGATING THE THREAT OF NUCLEAR TERRORISM: U.S. STRATEGIC OPTIONS

A. OVERVIEW

The purpose of this chapter is to consider traditional strategies such as deterrence, pre-emption, prevention, and coercive diplomacy and assess their applicability to counter the threat of nuclear and radiological terrorism. In the wake of the September 11, 2001 attacks, the issue of political violence expressed via mass destruction has raised security concerns to an unprecedented degree not seen since the end of the Cold War. As one leading expert has said, “for the first time in human history very small groups have, or will have, the potential to cause immense destruction.”¹⁴⁸ Former U.S. Senator Sam Nunn states, “Combating the proliferation of nuclear, chemical, and biological weapons is the most pressing issue that we face today.”¹⁴⁹ Senator Nunn maintains that the possession of such weapons “by rogue nations or terrorist groups could pose a clear and present danger to our society.”¹⁵⁰ Often, the impetus for concern about nuclear terrorism is attributed to the collapse of the former Soviet Union, which some contend has led to increased opportunities for the proliferation of nuclear and radiological materials.

However, another perspective is that the real focus behind this “new” threat rests not so much with proliferation, but rather in the changing nature of political violence by extremist groups. Experts in the field have long considered the sub-national threat in nuclear terrorism¹⁵¹ but al Qaeda’s shift in strategy to attack the “far enemy” has brought the prospect of mass violence to the forefront

¹⁴⁸ Laqueur, “The Terrorism to Come,” last section, par. 8.

¹⁴⁹ Cameron, “Nuclear Terrorism: A Threat Assessment for the 21st Century,” 152.

¹⁵⁰ Sam Nunn, “Senator Nunn’s Valedictory,” Speech reprinted in *Air Force Magazine*, December 1996, Vol. 79, No. 12, <http://www.afa.org/magazine/dec1996/1296nunn.asp>, (10 June 05).

¹⁵¹ See Brian Jenkins, “Will Terrorists Go Nuclear?” Santa Monica, CA: RAND, 1975; and Thomas Schelling, “Thinking about Nuclear Terrorism,” *International Security*, Spring 1983, Vol. 6 No. 4. Retrieved from JSTOR on 4 May 05.

in the minds of U.S. policy-makers and senior leaders.¹⁵² Indeed, directing nuclear anti-proliferation policies solely toward states may have limited effect in influencing transnational actors. Instead, policy makers should expand policy considerations against transnational networks with the potential for proliferation.

How might traditional strategies for mitigating the threat of nuclear proliferation—prevention, deterrence, coercive diplomacy and pre-emption—apply to non-state actors prone to extreme political violence, including terrorist groups? More specifically, how might traditional strategies for mitigating the threat of nuclear proliferation *already undertaken by states* mitigate proliferation of nuclear/radiological materials and weapons to radical social movements, and in particular, violent vanguards that such social movements spawn? Prevention remains the first and foremost strategy to deny terrorists the means of obtaining nuclear and radiological materials or their support networks the ability to proliferate. On the other hand, deterrence is concerned with dissuading terrorists from trying to acquire nuclear weapons or radiological materials. In addition to preventive and deterrent strategies, a combination of mixed-strategies to include coercive diplomacy and preemption can have an impact but in very specific situations. The shortfall will continue to be intelligence but a better way to analyze the likelihood for violence is to analyze how the message relates to the broader social movement and what inspires movements to spawn violent elements. Further, a meta-level perspective, as discussed in Chapter I, would allow for ground level view of what resonates with the affected audience. Such a methodology would enable a better opportunity to selective target specific audience with greater precision enabling traditional strategies of pre-emption, prevention, deterrence, and coercive diplomacy to be more effective.

¹⁵² Marc Sageman. "The Global Salafi Jihad," *The 9/11 Commission on the Terrorist Attacks Upon the United States*, 9 July 2003, http://www.9-11commission.gov/hearings/hearing3/witness_sageman.htm, (12 June 05); also, see "The 9/11 Commission Report," New York: W.W. Norton and Company, 2004, 59.

1. Key Terms and Definitions

As stated previously, part of the challenge in establishing a clear definition for terrorism lies in how the term, as a concept, is perceived by others. For example, as stated in Chapter I, the U.S. government has defined *terrorism* as “premeditated, politically motivated violence perpetrated against noncombatant targets by sub-national groups or clandestine agents, usually intended to influence an audience.”¹⁵³ The term “noncombatants” refers to civilians and unarmed or off-duty military personnel.¹⁵⁴ In addition, the term *international terrorism* refers to “terrorism involving citizens of the territory of more than one country.” A *terrorist group* is defined as “any group practicing or that has significant subgroups that practice, international terrorism.”¹⁵⁵ *State sponsors of terrorism* are described as those that provide funding, weapons, materials, and/or social or political space for planning and conducting operations. Currently, the U.S. government has designated six countries as state sponsors of terrorism: Libya, Sudan, Cuba, North Korea, Syria, and Iran.¹⁵⁶

While the State Department’s definition of terrorism includes the key component of political violence aimed against civilians, it also includes the notion that the act of terror is a role limited to sub-national actors or clandestine agents. However, the definition falls short to include terrorism as a tool used by states as an instrument of coercion and control against civilians. Although the six countries listed above are classified as state sponsors of terrorism, states that have used violence as means of suppressing discontent or repressing

¹⁵³ US Department of State, “Pattern of Global Terrorism”, xii. NOTE: In an interview with Dr. Rohan Gunaratna (10 May 05), he describes the basic components of terrorism as a “threat or act of *politically motivated violence* against non-combatants.” Key emphasis is politically motivated violence as opposed to criminal activity or random violence. This assumes a level of purpose or rational behind a violent act.

¹⁵⁴ Ibid., xii. Located in the footnote section at bottom of the page. NOTE: The term *non-combatant* is one that is widely debated, particularly as it pertains to military members out of uniform but it also includes states such as Israel where extremists have used the pretext “that all Jewish citizens, including women, served in the national army” for justification as legitimate targets in suicide attacks by . See Giles Kipel, *Jihad*, (London, UK: I.B. Tauris, 2000).

¹⁵⁵ Ibid.

¹⁵⁶ US Department of State, “Country Reports on Terrorism,” US Department of State, April 2005, <http://www.state.gov/s/ct/rls/c14813.htm>, (10 Jun 05).

contentious politics may also be considered as a form of terrorism targeted against its population. Such extreme measures as violence against a population may be interpreted as a form of terrorism. Examples of such acts include Chinese repression of the 1989 student protests in Tiananmen Square and measures adopted by Abdul Nasser in Egypt to minimize the rise of extremists by Islamist groups such as the Muslim Brotherhood. The repressive policies and measures by Abdul Nasser's government would serve as a catalyst for groups like the Muslim Brotherhood to justify political violence against the state, in this case the Egyptian government, giving rise to violent social movements.¹⁵⁷

2. State Sponsors, Rogue States & U.S. Policy

The primary focus of U.S. policy is to concentrate counterproliferation and WMD efforts against nations who may provide assistance to nations identified as state sponsors of terrorism. However, the nuclear challenge posed by transnational criminal and terrorist networks further complicates counterterrorism efforts which are already complex and challenging. In a joint session before Congress, President Bush declared that the US "will pursue nations that provide aid or safe haven to terrorism" and that "any nation that continues to harbor or support terrorism will be regarded by the United States as a hostile regime."¹⁵⁸ As a result, the following four principles were drafted and have become the guideline that shaped U.S. national counterterrorism strategy:

¹⁵⁷ NOTE: The rise of violent social movements aimed at the United States has been interpreted as a reaction of US policy and support for countries that appear to use repression as a means of control. Extremist groups such as al Qaeda fault the US for supporting what Jihadist consider bad governments. Aside from the most recent bombing in the tourist resort town of Sharm el-Sheik bordering the Red Sea, terrorist have chosen to attack the far enemy as demonstrated by the 9/11 attacks in the US, the bombings in Madrid, Bali, Casablanca, and most recently London.

¹⁵⁸ Office of the Press Secretary, (20 Sept 01), The White House, "Address to a Joint Session of Congress & and the American People," last accessed on 12 Jun 05 at <http://www.whitehouse.gov/news/releases/2001/09/20010920-8.html>

- Make no concessions to terrorists and strike no deals
- Bring terrorists to justice for their crimes
- Isolate and apply pressure on states that sponsor terrorism and force them to change their behavior
- Boost the counterterrorist capabilities of those countries that work the United States and require assistance¹⁵⁹

However, if rogue states are the principal target to counter the potential threat of nuclear and radiological terrorism, what are other potential targets of influence? What other key player(s) can or should be considered in the quiver of potential targets where deterrence, prevention, pre-emption or coercion could be applicable?

To explore such questions, it is useful to first consider what benefit extremists might derive from resorting to asymmetric means. In the RAND study titled, *Countering the New Terrorism*, John Arquilla, David Ronfeldt, and Michele Zanini developed a three-fold construct to define the challenges posed by non-state actors and terrorism in an effort to propose how best to tackle these issues. The first is terror as a form of coercive diplomacy or, more specifically, a means “to persuade others, by means of symbolic violence, whether to do something, stop doing something, or undo what has been done.”¹⁶⁰ The second is the adoption of a “war paradigm” which arises “when weaker parties cannot challenge an adversary directly and thus turn to asymmetric methods. A war paradigm implies taking a strategic, campaign-oriented view of violence” where the “aim is to inflict damage, in the context of what the terrorists view as an

¹⁵⁹ Department of State, “Pattern of Global Terrorism”, pg. ix.

¹⁶⁰ John Arquilla, David Ronfeldt, and Michele Zanini, “Networks, Netwar, and Information-Age Terrorism,” in *Countering The New Terrorism* by Ian Lesser, Bruce Hoffman, John Arquilla, David Ronfeldt, Michele Zanini, and Brian Jenkins, (Santa Monica, CA: RAND, 1999), 68.

ongoing war.”¹⁶¹ Finally, the third is the “new world” paradigm where motivation is “driven by religious mania, a desire for totalitarian control, or an impulse to chaos” reflecting more of a millenarian movement as an off shoot of small groups led by a prophet in pursuit of “salvation by seeking a final violent cataclysm.”¹⁶² Regardless of the type of motivation, a group choosing to employ WMD has two key considerations: 1) message to a target audience and 2) obtaining material. Thus, in the case of WMD, the target set may expand beyond state-sponsors and terrorists to include proliferators and the broader population who may not directly support terrorist group by providing tacit support.

B. COMPETING OR COMPLEMENTARY STRATEGIES?

In subsequent sections the author examines traditional strategies in determining their applicability to non-state actors. Specifically, the author will assess the meaning of coercive diplomacy, preemption, prevention and deterrence in the context of sub-state actors. The focus is to realize whether or not current policies could benefit in developing strategies that go beyond state sponsors of terrorism and include various transnational networks. The objective is to understand the benefits of any one strategy against another in an effort to assess whether individual or mixed strategy is more effective in countering transnational networks. If so, which combination or set of strategies would prove most effective? For each strategy, we shall examine the theory and practice of each followed by an analysis of its applicability against non-state actors.

1. Coercive Diplomacy

As a concept, coercion has been often employed throughout the history of international diplomacy with mixed results. However, the general intent of coercive diplomacy is to place a demand on an adversary backed by a credible threat of punishment for noncompliance. The threat should be sufficiently potent

¹⁶¹ John Arquilla, David Ronfeldt, and Michele Zanini, “Networks, Netwar, and Information-Age Terrorism,” 69. NOTE: Rogue states may apply this strategy to compensate for a lack of conventional forces to impact or influence larger nation-states. In this context, terrorism provides a mechanism through which rogue states can affect other groups or states. This concept will be discussed further in the case of Libya under coercive diplomacy.

¹⁶² Ibid.

to persuade the opponent that it is in his/her best interest to comply with the demand. Coercive diplomacy is considered a “defensive” diplomatic strategy that relies on the threat of force rather than the use of force to achieve the objective.¹⁶³ Where deterrence attempts to dissuade an adversary prior to the initiation of an action before it has begun, coercive diplomacy is in response to something that has occurred.¹⁶⁴ If force must be used to strengthen diplomatic efforts at persuasion, it is employed in “an exemplary manner,” by way of limited military action in order to demonstrate resolution and willingness to escalate to higher levels of military action if necessary.¹⁶⁵

a. Theory

As a strategy, coercive diplomacy is implemented to challenge an adversary’s efforts and to shift the balance to a more advantageous or desirable position. In order to do so, George characterizes the various strategic options or types of defensive objectives into the following three types:

Coercive Diplomacy			
<i>Deterrence</i>	<i>Type A</i>	<i>Type B</i>	<i>Type C</i>
Persuade opponent not to initiate an action	Persuade opponent to stop short of the goal	Persuade opponent to undo the action	Persuade opponent to make changes in government

Table 6. Three Types of Defensive Coercive Diplomacy.¹⁶⁶

¹⁶³ Alexander George, *The Limits of Coercive Diplomacy*, (Boulder, CO: Westview Press, 1994), 2.

¹⁶⁴ Alexander George, “Forward,” in *The United States and Coercive Diplomacy* edited by Robert Art and Patrick Cronin, (Washington, DC,: United States Institute for Peace, 2003), pg. vii. NOTE: In his later writing, George also refers to coercive diplomacy as *compellence*. However, in his previous writings, George draws a distinction between coercive diplomacy and compellence based in that compellence (1) does not “distinguish between defensive and offensive uses of compellence;” and (2) the “concept of compellence implies exclusive or heavy reliance on coercive threats, whereas (George) wishes to emphasize the possibility of a more flexible diplomacy that can employ rational persuasion and accommodation as well as coercive threats to encourage the adversary to comply with the demands or to work out an acceptable compromise.” Quote is located in George, *The Limits of Coercive Diplomacy*, 2.

¹⁶⁵ George, *The Limits of Coercive Diplomacy*, 2.

¹⁶⁶ George, *The Limits of Coercive Diplomacy*, 9. NOTE: George characterizes offensive coercive diplomacy as compellence or *blackmail strategy*.

Type A is limited to merely stopping your opponent's action; Type B is characterized as a more ambitious aim and it requires your opponent to undo an action that has already occurred; Type C on the other hand is a cessation of the opponents "hostile behavior" through a demand for demand for change in the composition of the adversary's government or in the nature of the regime.¹⁶⁷ According to George, Type C is the most difficult because "this type of demand stretches coercive diplomacy to its outer limits since it may blur the distinction between defensive and offensive use of threats."¹⁶⁸ Thus, a strategy using coercive diplomacy calls for using sufficient force of "an appropriate kind" as to demonstrate one's resolve in protecting well-defined interests, as well as, the credibility and determination to use more force when necessary.¹⁶⁹ The purpose of an exemplary use of force in coercive diplomacy is to convey a willingness to do more or to persuade an adversary to stop and/or undo a course of action. The "offended state" must make clear whether its action is a reprisal or an exemplary component of coercive diplomacy.¹⁷⁰

As in each of the strategies presented in this thesis, coercive diplomacy assumes a "rational" opponent. That is, an adversary who is "receptive to and will correctly evaluate information that is critical to the question of whether the costs and risks of not complying will outweigh the gains to be expected from pursuing a course of action."¹⁷¹ Policymakers and leaders must be cognizant of personal bias and critically examine this option. Failure to

¹⁶⁷ George, *The Limits of Coercive Diplomacy*, 8.

¹⁶⁸ Ibid., 9. NOTE: George makes a compelling case to state that coercive diplomacy is by no means the only nonmilitary strategy. He lists several other strategies such as "drawing the line", "buying time to explore negotiated settlement", "retaliation and reprisals", as well as others in which defenders may employ against an opponent. See George, *The Limits of Coercive Diplomacy*, 8.

¹⁶⁹ Ibid., 10.

¹⁷⁰ George, *The Limits of Coercive Diplomacy*, 11. NOTE: George highlights the significance of combining threat and the employment of the threat by "appropriate communication to the opponent". Furthermore, if force is used, it should not be part of a conventional military strategy for resolving a conflict of interest.

¹⁷¹ Ibid., 13. NOTE: George identifies three key variables necessary in that specific situation for coercive diplomacy to be successful: (1) magnitude of the demand(s) made on the opponent; (2) the magnitude of the opponent's motivation not to comply; (3) whether the opponent will feel the threatened punishment is sufficiently credible to and potent to cause him to comply. (pg. 14)

critically understand rationalize decision-making from the adversary's perspective can have a significant impact on the success or failure of a coercive strategy. As George explains, "The prospects for success in the choice of diplomacy are greatly enhanced if the policymaker can view the crisis event and his own crisis behavior from the perspective of the opponent."¹⁷² Failure to recognize false "images" or believing in an adversary's deception raises the likelihood of miscalculation and ineffective policymaking resulting to poor decisions. Following this logic, the key ingredient in strategy development is the accuracy of your information.¹⁷³

To better assist policymakers in applying the concept of coercive diplomacy into a strategic objective, George proposes the following:

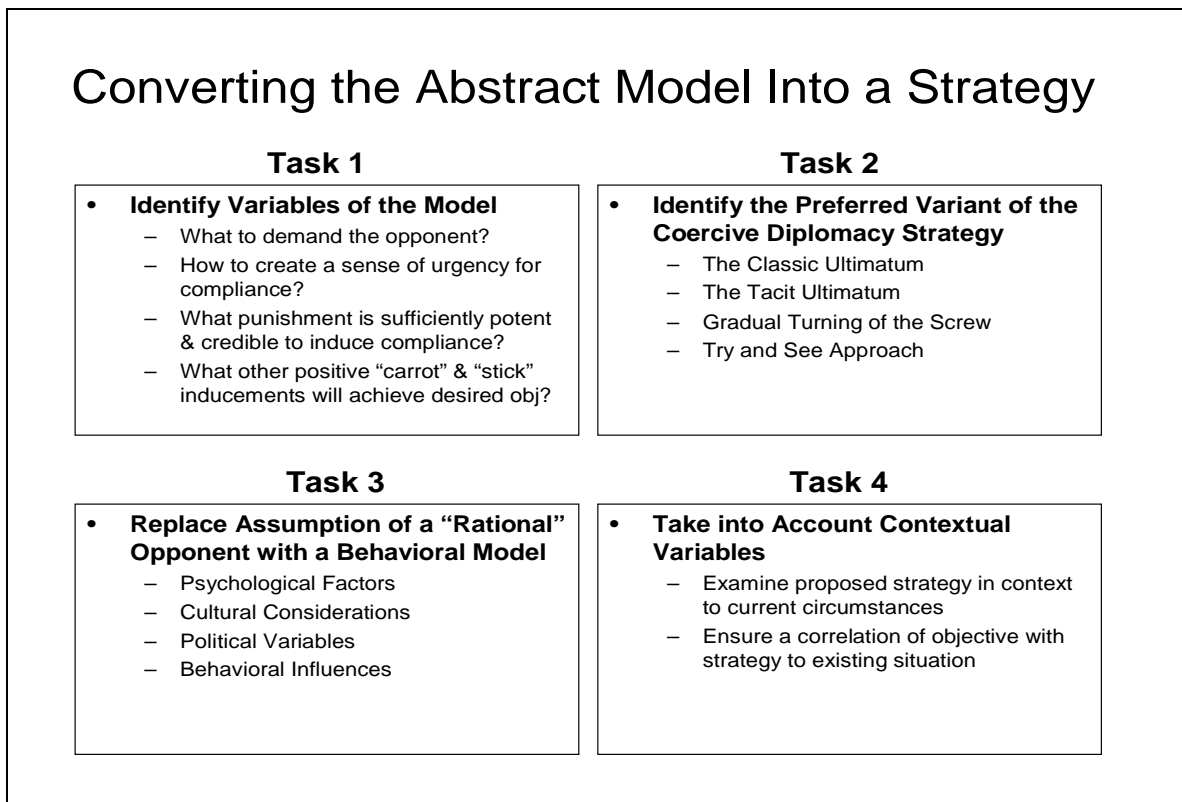


Figure 4. Four Tasks in Building a Strategy for Coercive Diplomacy¹⁷⁴

¹⁷² George, *The Limits of Coercive Diplomacy*, 288.

¹⁷³ *Ibid.*, 291.

¹⁷⁴ George, *The Limits of Coercive Diplomacy*, 16-21. NOTE: Adapted from readings presented in George, Alexander (1994). "The Limits of Coercive Diplomacy"

In Tasks 1 and 2, George sets the framework by first posing a set of basic questions critical to the development of a coercive strategy. He then builds a set of potential responses ranging from a time-sensitive, highly confrontational set of approaches (Classic Ultimatum and Tacit Ultimatum) to a set of incremental threats that is intended to apply pressure gradually (Turning of the Screw and the Try and See approach). In each case, the type of coercive strategy varies in degree, scope, and urgency.

b. Practice

The most recent example of an ultimatum delivered in response to a terrorist act was President Bush's address to the Taliban regime shortly after the attacks on 9/11. In 2001, President Bush dictated four demands on the Taliban regime: first, deliver all al Qaeda leaders; second, the release of all foreign nationals; third, close all terrorist training camps; and, fourth, relinquish all terrorists to "appropriate authorities." The President concluded: "These demands are not open to negotiation or discussion. The Taliban must act, and act immediately. They will hand over the terrorists, or they will share in their fate."¹⁷⁵ As with other examples of coercive diplomacy, success or failure is difficult to determine.¹⁷⁶ The Taliban quickly rebuffed the US request and within a few days Mullah Omar's delay tactics proved unacceptable and a formal response by US and British forces came a short time later on October 7, 2001 with air strikes. However, Crenshaw implies that from the beginning, the US strategy was not to induce bin Laden and al Qaeda to stop terrorism but to directly disrupt and destroy the group's ability to conduct terrorism.¹⁷⁷ As a result, there was limited room for maneuver for the Taliban and the pending conflict had become a zero-

¹⁷⁵ Martha Crenshaw, "The Response to Terrorism," in *The United States and Coercive Diplomacy* edited by Robert Art and Patrick Cronin, (Washington, D.C.: United States Institute of Peace Press, 2003), 336.

¹⁷⁶ NOTE: Crenshaw points out examples such as the diplomatic efforts that ultimately led to the first Gulf War against Saddam Hussein. In this case, Hussein failed to yield to the demands placed on Iraq and resulted in a forceful expulsion. On the other hand, the fact that the coalition was able to carryout and deliver on the coercive threat can also interpreted as a success.

¹⁷⁷ Crenshaw, "The Response to Terrorism," 343.

sum game. US resolve was immediate and unlike the ambiguity that surrounded the attacks on the Khobar Towers in Saudi Arabia, the Bush administration had made their ultimatum to the Taliban clear.¹⁷⁸

Based on the above, the 1998 strikes in Afghanistan failed to deter al Qaeda from attempting the attacks on 9/11. While the strikes in 1998 were intended to serve as a decapitation strike against al Qaeda's leadership, a secondary aim of deterring future aggression also clearly failed given the terrorists' attacks on the Pentagon and the World Trade Center. However, coercive diplomacy appeared to have had more of an impact in altering, influencing, and disrupting states providing sanctuary, like Sudan, that directly or indirectly provided assistance to Qaeda.¹⁷⁹ Yet, in a similar scenario, coercive diplomacy failed to loosen al Qaeda's influence over the Taliban. In this case, coercive measures against the Taliban government in Afghanistan had little influence in meeting US demands to turn over those responsible for the attacks on September 11, 2001. In the case of Pakistan, security concerns with India, the threat of internal instability, and promises of economic inducements were all factors that led President Musharraf to announce his support to the US in the search for al Qaeda. Fear of the rise in domestic support for radical Islamists, placed President Musharraf in a precarious position compelling him to choose a path that would break the ties Pakistan had with the Taliban, prior to 9/11.¹⁸⁰ Coupled with pressure and inducements from the US, President Musharraf ultimately backed US efforts to search for those involved in the 9/11 attacks.

¹⁷⁸ Philip B. Heymann, *Terrorism, Freedom, and Security: Winning without War*. Cambridge, MA: MIT Press, 2003), 119; Paul Pillar, *Terrorism and US Foreign Policy*, (Washington, D.C.: Brookings Institute Press, 2001), pgs. 110-115; and Rohan Gunaratna, *Inside Al Qaeda*, (New York: Berkley Books, 2003), 191. NOTE: As Pillar writes the difficulty in solid and timely tactical intelligence made the response difficult. Later, according to Gunaratna, Saudi Security Services would point to Saudi Hezbollah, an Iranian-supported Shia group.

¹⁷⁹ Ibid., 343. NOTE: Crenshaw highlights diplomatic pressure placed on Sudan that ultimately compelled al Qaeda to leave but its ambiguity in continued ties with the radical Islamic groups made it difficult to determine whether coercive diplomacy had a direct impact.

¹⁸⁰ Rohan Gunaratna, *Inside Al Qaeda*, (New York: Berkley Books, 2003), 290.

c. Assessment

In sum, the challenge of assessing the effects of coercive diplomacy is difficult at best. The focus of coercive diplomacy has and continues to focus on state-to-state interactions but the key in understanding its effectiveness is dependent upon knowing which adversaries can be coerced and which ones cannot. Key to knowing the strength of your coercive strategy is to understand what the adversary considers valuable. It is in this process where policymakers assume that adversaries possess tangible assets that their leaders and citizens value enough to not want to risk losing them. Yet, the record for coercive diplomacy is not an encouraging one. In comparing 16 cases that took place from 1990 to 2001, Art analyzed the success rate of coercive diplomacy. The comparative breakout resulted in a 31% success rate, 50% failure rate, 6% ambiguous, and 12% mixed.¹⁸¹

In reviewing the literature and examining the results, it becomes clear that policymakers will require a mix of strategies that are concise, clear, and consistent. Coercive strategies will not come in a “one-size-fits-all” and must be tailored to meet a broad range of multiple actors, some of which may not be adversaries. Beyond attempting to assess or anticipate strategic moves by the adversary’s leadership, an assessment of the cultural and social climate may be instrumental in developing effective strategies. If extremist sentiment is born of a social movement, than developing an understanding of who, how, and why the movement exists may serve as a clue to what vulnerabilities and/or opportunities are present to develop potential alternative strategies. These answers become essential when and if an information operations strategy is considered. Understanding the cause for collective action by moderates and even extremists who perceive joining or not joining is based on perceived benefits or payoffs. If

¹⁸¹ Robert Art, “Coercive Diplomacy: What Do We Know?” in *The United States and Coercive Diplomacy* edited by Robert Art & Patrick Cronin, (Washington, D.C.: United States Institute for Peace, 2003), 359-420. NOTE: For a detailed break out of the various cases refer to the article by Art, however in broad term the incidents between 1990-2001 are listed as follows: Somalia (92-93 & 93-94), Haiti (94), N. Korea (94), Bosnia (95), China (96), Iraq (90-91, 91, 92-92, 94, 95, & 98), Kosovo (99), Terrorism I (93 assassination attempt of former President George H. W. Bush), Terrorism II (bin Laden, 98), and Terrorism III (Afghanistan, 01)

so, what are they? What are the incentives and what are the motivations behind them? Through this analysis we may begin to assess the relative strength of a potential strategy that may be more effective with an appropriate mix of punishment and rewards or a different strategy altogether.

2. Preemption

Perhaps no strategy has received more attention and debate than the Bush administration's shift in US policy towards preemption. In the same 2002 speech presented at West Point, President Bush stated that

For much of the last century, America's defense relied on Cold War doctrines of deterrence and containment. In some cases those strategies still apply. But new threats also require new thinking. Deterrence—the promise of massive retaliation against nations—means nothing against shadowy terrorist networks with no nation or citizens to defend. Containment is not possible when unbalanced dictators with weapons of mass destruction can deliver those weapons on missiles or secretly provide them to terrorist allies.¹⁸²

The President's position supported by the National Security Strategy makes the point clear that preemptive strikes are an essential part of the administration's posture to deter potential WMD attacks. It is the Bush administration's belief that the risk of inaction, "even if uncertainty remains as to the time and place of the enemy's attack" poses a grave risk to the national security. Further, "To forestall or prevent such hostile acts by our adversaries, the United States will, if necessary, act preemptively."¹⁸³ However, in order for a preemptive strategy to be successful, the threat must be clear and unassailable. The accuracy and quality of intelligence is paramount in delivering the kinds of results desired by the President. The relevant questions thus are: When does preemption become necessary? Against whom do you preempt? What are the legal/political ramifications?

¹⁸² Office of the Press Secretary, "The National Security Strategy of the United States," The White House, September 17, 2002, <http://www.whitehouse.gov/nsc/nss5.html>, (May 15, 2005).

¹⁸³ Ehud Sprinzak, "The Great Superterrorism Scare," *Foreign Policy*, (Fall 1998): 110-24.

a. Theory

In the context of counterterrorism, the theory of preemption is best described as a short-term strategy that is focused on thwarting an attack. Unlike deterrence, preemption relies not on the threat of force, but on the use of force against an enemy whose attack is perceived as *imminent*.¹⁸⁴ It is a strategy of striking first, where the initiative is taken by the intended victim and “designed to forestall the mobilization and deployment of the adversary’s existing military forces.”¹⁸⁵ To carry out a preemptive attack requires to key theoretical prerequisites: the capability and intent. “Potential target states must possess the ability to produce and distribute weapons and/or enabling materials to non-state actors.”¹⁸⁶ In terms of thwarting a terrorist attack, preemption is also thought of as requiring lethal force or assassination but this is not necessarily the case.¹⁸⁷ In the practical examples below, a couple of cases are present to demonstrate how preemption was used against nation states and non-state actors. However, in the case of preempting proliferation of weapons materials, US analysts must be certain of the threat. Preemption is based on the belief that the aggressor has the means, ability, desire and intent to carry out an attack.

b. Practice

An example of a preemptive attack occurred in 1967 between Israel and the alliance formed by Egypt, Syria, and Jordan that would later be referred to as the 1967 Arab-Israeli War (also referred to as the Six Day War). In short, Israel interpreted Egypt’s moves in May of 1967 to close the Straits of Tiran and the massing of forces along the Sinai Peninsula as signs of an imminent attack against Israel. The Egyptian maneuvers gave the Israeli forces *casus belli* to

¹⁸⁴ Michael Eastman and Robert Brown, “Security in the Grey Zone: Alternatives for Preventing WMD Handoff to Non-State Actors,” in *Defeating Terrorism: Shaping the New Security Environment*, edited by Russell Brown and Reid Sawyer, (Guilford, CO: McGraw-Hill, 2003), 88-102. NOTE: Based on discussions and notes with Dr. Arquilla, the key term is *imminent* attack by an adversary. That is, a preemptive strike is done in the face of an immanent attack by the adversary (1 Sep 05).

¹⁸⁵ Michael Eastman and Robert Brown, “Security in the Grey Zone: Alternatives for Preventing WMD Handoff to Non-State Actors,” 93.

¹⁸⁶ *Ibid.*, 93.

¹⁸⁷ David Tucker, *Skirmishes at the Edge of Empire: The United States and International Terrorism*, (Westport, CT: Praeger, 1997), 103-105.

move to war. Meanwhile, conflicts arose between Egypt, Syria, and Jordan primarily driven by self-interest among the Arab leaders. Sensing a pending strike by combined Arab forces and motivated its own self-interests, Israel capitalized on Egypt's aggression by initiating preemptive air strikes against Egyptian Air Forces while on the ground guaranteeing the Israeli forces air superiority throughout the conflict. In the east, Jordan had initiated attacks in the city of Jerusalem but the disorganized Arab forces were quickly neutralized from causing further aggression by the Israeli forces. Within a few hours Israel managed to overwhelm remaining Syrian, Jordanian, and Iraqi air forces. The speed, ferocity, and effective planning by the Israeli Defense Force ensured a quick and complete victory within a matter of days. Considered by one historian, Avi Shlaim, "the most spectacular military victory in Israel's history,"¹⁸⁸ The preemptive strike ensured that the Israeli forces gained the upper hand in preventing a possible invasion by Egypt and its Arab allies. In this case, Israeli intelligence and intentions were clear, planned, deliberate, and well thought out.

A more tactical example of preemptive a terrorist attack occurred in Amman, Jordan on 20 April 2004 where Jordanian authorities arrested 6 individuals and killed 4 in a raid to pre-empt a suicide truck bomb attack. A cell comprised of local nationals with alleged ties to Abu Musab al-Zarqawi, also a Jordanian national, planned and coordinated a strike that was within a few days of following through with the pre-planned strikes. The cell's plan was to use several specially modified heavy duty trucks capable of penetrating perimeter walls and gates. These trucks were filled with 20 tons of industrial chemicals and explosives to crash through the entry gates and check point surrounding the Jordanian intelligence agency headquarters, located in country's capital of Amman, destroying the headquarters buildings and contaminating the area. The estimated number of casualties would have been anywhere from as low as 20,000 up to 80,000 lives and impacting an area approximately a half-a-mile in

¹⁸⁸ Avi Shlaim, *The Iron Wall: Israel and the Arab World*, (New York: W.W. Norton & Co., 2000), 241.

diameter. The original plan had also called for strikes against the US embassy and the Prime Minister's office.¹⁸⁹

c. Assessment

In sum, the significant factor in each of the two cases above was intelligence. In the first case substantial force was used but in a deliberate and focused way. Likewise in the tactical example force was applied to neutralize four suspects but the element of speed, surprise, and intelligence were essential for thwarting the threat despite having the means, ability, and intent of carrying out these plans. As reflected in both *The 9/11 Commission Report: The Final Report of the National Commission on Terrorist Attacks upon the United States (Authorized Edition)*, and *The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction* gaps in our intelligence system are wide enough to make the U.S. ability to assign blame and retaliate difficult. "The bad news is that we still know disturbingly little about the weapons programs and even less about the intentions of many of our most dangerous adversaries."¹⁹⁰ Still, in dealing with terrorism, preemption has a place for "just-in-time" disruption but the gamble and cost may be great and the payoff dependent on multiple factors namely perfect timing and actionable intelligence.

Another factor to consider is that "preemption is narrowly bounded to address only the physical transfers of weapons, technology, and expertise from states to non-state actors."¹⁹¹ As Professor Gunaratna explained, states tend to spend a great deal of time and effort in smallest segment in the spectrum of conflict and operations driving to resources to support preemptive strategies as opposed to the broader spectrum where other strategies may prove more

¹⁸⁹ BBC News, "Jordan Airstrike 'Confessions'", April 26, 2004, http://news.bbc.co.uk/2/hi/middle_east/3661495.stm, (22 May 05). See also "Special Report: Jordan Chemical Attack Thwarted," by Issy Boim, Air Security International, (29 Apr 04), located at <http://www.airsecurity.com/newsite/pdfs/Amman-Chem-Attack.pdf>.

¹⁹⁰ Laurence H. Silberman and Charles S. Robb, "Report to the President of the United States," *The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction*, March 31, 2005.

¹⁹¹ Eastman and Brown, "Security Strategy in the Grey Zone," 93.

effective.¹⁹² For example, dealing with a problem before it becomes a crisis prevents adversaries for obtaining the means. In dealing with nuclear terrorism, if preemption is our last resort, we may be too late. For instance, not until the success of coercive diplomacy activities against Libya to renounce its support for terrorism and WMD did US and the United Nations officials discover the extent to which Libya had developed its weapons program. One Bush administration official stated that their “work was much further advanced” than expected.¹⁹³ The example reveals that in closing a dialogue with the adversary and in light of limited resources officials are limited in the knowledge of the effectiveness in their policies. With limited intelligence or knowledge, preemptive strikes have the potential is setting off a chain of events leading to unforeseen circumstances. As a result, preemption should be limited and finite if used at all.

3. Prevention

Unlike preemption, a preventive strategy seeks to remove or eliminate the chance of an adversary from acquiring a capability. For example, in the case of weapons proliferation, a preventive strategy seeks to remove the chance that a potential hostile state may transfer WMD through counterproliferation measures and thwarting terrorist from acquiring the means to create WMD weapons. From a strategic perspective, states have launched preventive strikes in an effort “to block or retard the rise of a challenger while that opportunity is still available.”¹⁹⁴ Lawrence Freedman distinguishes the two by describing prevention as strategy that is “cold blooded: it intends to deal with a problem before it becomes a crisis, while preemption is a more desperate strategy employed in the heat of crisis.” Of the four strategies prevention appears to be the broadest in meaning and interpretation. For example, others would include dealing with the study and understanding of the causes that lead to political violence as an element of a

¹⁹² Author's Interview with Prof Gunaratna during the week of 10-15 May 05 in Ottawa, Canada.

¹⁹³ CNN Report, “Bush Official: Libya's Nuclear Program a Surprise,” December 19, 2003, <http://www.cnn.com/2003/WORLD/africa/12/19/libya.nuclear/>, (15 Jun 05).

¹⁹⁴ Eastman and Brown, “Security Strategy in the Grey Zone,” 94 NOTE: The prime example of such an offensive strike in a preventive role is the 1981 Israeli bombing of the Iraqi nuclear facility in Tammuz.

preventive strategy.¹⁹⁵ However, for the purposes of this essay we shall focus on the two general forms of preventive strategy passive and active.

a. Theory

The basic idea of prevention can be described as a concept that “provides a means of confronting factors that are likely to contribute to the development of a threat before it has had a chance to become imminent.”¹⁹⁶ Thus states would also consider preventive strategies that are *passive* as those actions taken to mitigate the availability of a potential adversary from gaining access to or the means for terrorist attacks. This passive defensive approach may include shoring up defenses in such a way to make it difficult for a terrorist to acquire or steal sensitive materials. The objective is to reduce vulnerabilities. Another aspect of passive defense is to increase fortifications and physical barriers in such way that someone attempting to bring in a destructive capacity is thwarted by the defenses that are in place. An example of this is are road blocks, gates, and check in points. Essentially, a passive preventive strategy is one that protects sensitive materials from getting out or denying harmful material (or attacks) from getting in. In passive preventive strategy, the protector controls the ways and means where an attack may occur.

In contrast, preventive strategies that are active require “the employment of limited offensive action and counterattacks to deny a contested area or position to the enemy.”¹⁹⁷ For example, interdiction or striking an adversary before he gains access or the means of WMD is an example of an active preventive strategy. This concept is focused on physically halting the proliferation of WMD by a supplier or rogue state. According to the 2002 *National Strategy to Combat Weapons of Mass Destruction* active and passive defense are considered part of the US government's counterproliferation strategy.

¹⁹⁵ Tucker, *Skirmishes at the Edge of Empire*, 99-102. NOTE: More on this idea under the assessment portion of Preventive Strategy.

¹⁹⁶ Lawrence Freedman, *Deterrence*, (Cambridge, MA: Polity Press, 2004), 85.

¹⁹⁷ Joint Publication 3-40, *Joint Doctrine for Combating Weapons of Mass Destruction*, pg. GL-2

b. Practice

In practice the US government applies its preventive strategy primarily in three ways: nonproliferation, counterproliferation, and consequence management.¹⁹⁸ In the area of non-proliferation, the US engaged in diplomatic efforts to mitigate the proliferation of nuclear technologies and other sensitive materials through multilateral regimes, arms control practices, and other state-to-state agreements. The effort is focused on ensuring multinational cooperation in controlling and managing sensitive materials, import/export controls, and sanctions against states who fail to comply.¹⁹⁹

The active enforcement of these policies deals more in the realm of counterproliferation. Specifically, events that are related to acts of interdiction and deterrence are considered part of counterproliferation. An example of such programs include the Container Security Initiative (CSI) where states agree to allow for the inspection of US-bound containers to be inspected in their home port of origin prior to placing the container on ships.²⁰⁰ Also, the Proliferation Security Initiative (PSI) is an agreement with 60 nations that allows for the interdiction of sea or air shipments with the specific intent to inspect for WMD or WMD-related materials to or by states that are labeled as a “proliferation concern.”²⁰¹ In addition, through programs like the Non-Proliferation Treaty (NPT) and Cooperative Threat Reduction (CTR) the US engages with other states to reduce access or remove nuclear and radiological materials and

¹⁹⁸ Joint Publication 3-40, *Joint Doctrine for Combating Weapons of Mass Destruction*, pg. GL-2.

¹⁹⁹ NOTE: “The majority of national assets dedicated to finding nuclear devices and neutralizing them resides between the Department of Energy (DOE) and the Department of Defense (DOD). The administrative authority for managing a domestic nuclear terrorist event rests with the Department of Homeland Security (DHS). Overseas authority rests with the Department of State (DOS) and specifically with the individual ambassadors as the President’s representatives. External intelligence responsibilities and capabilities reside with the Central Intelligence Agency (CIA), Defense Intelligence Agency (DIA), and other national technical assets. Domestic intelligence falls on the Federal Bureau of Investigation (FBI) and state law enforcement officers who may still remain clouded by an ‘evidence for prosecution mentality.’” Source for brief synopsis was Maj Dave Downing in a report written on 2 May 2005 titled, “United States Internal and External Nuclear Weapon Detection and Interdiction Following a Domestic Nuclear Terrorist Strike”

²⁰⁰ Jonathan Medina, “Nuclear Terrorism: A Brief Response of Threats and Responses,” *Library of Congress*, Congressional Research Service, (10 Feb 2005), 11.

²⁰¹ *Ibid.*, 11-12.

weapons.²⁰² Where nonproliferation and counterproliferation concentrate on actions prior to an event, consequence management (CM) focuses on the recovery after an attack. CM is concerned with minimizing the consequences of a WMD attack against the US population and responding to the recovery of military forces, civilians and allies.²⁰³

The best example of an offensive preventive attack was the Israeli strike of the Iraqi nuclear plant in Osirak near Baghdad in 1981. Growing concerns of further isolation and the fear over the coercive potential of an Arab state owning a nuclear weapon drove Israel to seek an end to Iraq's development effort. In an address to the Israeli people Prime Minister Menachem Begin stated that "On no account shall we permit an enemy to develop weapons of mass destruction against the people of Israel."²⁰⁴ Israel did not anticipate the response received by the Arab world and the United States but justified Operation Babylon in the interest of Israeli survival and national security.

c. Assessment

Preventive strategy is perhaps the most critical first step in mitigating or preventing a threat from potential threats of "superterrorism." In concept it is most critical because it was within the best interest to protect those specific areas considered most important or vital to core interests. As a consequence, the intelligence required for a preventive strategy is high but slightly less than what is required for a successful preemptive strategy. In setting the agenda to minimize the terrorist threat the first step is to isolate and minimize vulnerabilities. Additionally, returning to the idea proposed previously on addressing the root causes for extremism as part of a preventive strategy is also of interest. The ultimate preventive strategy, if it is to be truly preventive, must at least consider the domestic and transnational threat posed by weapons of mass

²⁰² Michael Levi and Michael O'Hanlon, "Why Arms Control Still Matters," *Current History*, vol. 104, no. 681, (April 2005), 162-168.

²⁰³ Counterproliferation Program Review Committee, "Report on Activities and Programs for Countering Proliferation and NBC Terrorism," May 2005, at <http://www.acq.osd.mil/cp/cprc05xsm.pdf>, (8 Jun 05), 2.

²⁰⁴ Shlaim, "The Iron Wall: Israel and the Arab World," 384-389.

destruction. In essence, a WMD can potentially be a threat that may cross boundaries and interests across a global spectrum. This strategy may prove effective in developing a “honey pot” type of scenario where stings may be effective in drawing out components of network bent on acquiring, supplying, and buying nuclear or radiological materials. The goal may shift to target the supply network, procurement network, or terrorist network. While it is possible that one network could theoretically function in all three environments, it is highly unlikely. In the case of al-Qaeda and Aum Shinrikyo, both organizations attempted to procure weapons-grade material and failed. Assuming that the target of such a plan is the supply network, friendly forces could assume the role of procurement or terrorist network and draw out the network who may be willing to supply such materials.

In sum, this section reviewed the key aspects of current US strategies as it relates to prevention. Key aspects of an effective preventive strategy include passive and active preventive efforts as well as multilateral efforts focused on stemming the proliferation of highly sensitive material. In a recent briefing before the House Committee on Homeland Security, Laura Holgate stated that the key difference “between a terrorist and a nuclear terrorist is found in the word ‘nuclear’: no nuclear material, no nuclear terrorism.”²⁰⁵ In effect, the intelligence requirement to prevent proliferation of sensitive material is not limited to just radiological and nuclear matter or even dual-use technology, but also includes close monitoring and tracking of facilities that are unguarded or with weak security. Finally, and perhaps the most challenging is tracking the proliferation of technical skill and knowledge. An effective prevention strategy would also have to include policies to deter the proliferation of the knowledge and know-how in putting such a capability together.

²⁰⁵ Laura Holgate, “Building a Nuclear Bomb: Identifying Early Indicators of Terrorist Activities,” 26 May 05. Statements made before the House Committee on Homeland Security Subcommittee on Prevention of Nuclear and Biological Attack, copy of prepared statements found at NTI website http://www.nti.org/c_press/c4_testimony.html

4. Deterrence

Throughout the Cold War, the concept of Mutually Assured Destruction (MAD) served as the principle deterrent strategy between the United States and the Soviet Union where the threat of a retaliatory strike by one over the other ensured the annihilation of both.²⁰⁶ The basic concept was one where the cost and benefit for both was well known and understood by both. In their book *Deterrence in American Foreign Policy: Theory and Practice*, Alexander George and Richard Smoke break down a conceptual model of deterrence and cost-benefit analysis. As described, deterrence works when the adversary, determines that its projected cost plus the risks of a potential action outweigh any real benefit or advantage from the resulting action.²⁰⁷

When Deterrence Works
$C \text{ (Costs)} + R \text{ (Risks)} > B \text{ (Benefits)}$

Table 7. Basic Deterrence Theory²⁰⁸

However, as Thomas Schelling points out, deterrence will only be effective if the threat is (1) credible and (2) rational.²⁰⁹ In short, to be effective, deterrent strategies are dependent on the credibility as determined from the perspective target, be it non-state actors, proliferators, or states. At a minimum, the initiator must appear to have both the capability and the intent to inflict the threatened punishment. In response, the adversary must conclude that the risks of taking action against the intended target or victim outweigh the benefits.

²⁰⁶ Eastman and Brown, "Security Strategy in the Grey Zone," 91.

²⁰⁷ Alexander George and Richard Smoke, *Deterrence in American Foreign Policy: Theory and Practice*, (New York: Columbia University Press, 1974), 61-68.

²⁰⁸ Author's notes based on the readings by Thomas Schelling and Graham Allison. NOTE: Deterrence Theory works best when an opponent's assessment of the cost and risk associated with a specific action outweighs any likely benefit in continuing or initiating a desired act.

²⁰⁹ Thomas Schelling, *Arms and Influence*, (New Haven, CT: Yale University Press, 1966), 36-43.

a. Theory

In applying this theoretical approach to the terrorist threat of WMD, one of the first questions asked is who to deter? And, can terrorists be deterred? If we're to apply the deterrence against a proliferation network, we may run into the same challenges as with the preemption strategy. Much like preemption, there is no reason to assume deterrence is "an effective way to approach the specific threat of WMD proliferation without first examining the strategy's theoretical and operational requirements."²¹⁰ To rely on a deterrent strategy for the handoff of nuclear and radiological materials is a straightforward policy where the US promises the destruction of a regime for any state that transfers WMD to non-state actors. According to Eastman and Brown, a deterrent strategy has a reasonable chance of success if both of the following conditions are met:

- 1) The US must have the ability to monitor WMD transactions and demonstrate to potential adversaries that any attempt to sell or hand off WMD will not go undetected. If a proliferating state thinks it will not get caught, then concerns about potential punishment can be brushed off.
- 2) Efforts should be taken to make the threatened response credible. Proliferators must believe that there is a reasonable chance that the United States has both the capability and the will to impose the promised penalties.²¹¹

Once again, we see the challenge as being both possessing and communicating the capability and intent to strike back if struck, and that the cost/risks outweigh the perceived benefit. In the following section, we shall briefly examine how deterrence theory has been applied in context to previous attacks.

b. Practice

In considering US response to terrorist attacks prior to September 11, 2001, one can argue as Jenkins and Davis do, that "al Qaeda leaders saw the United States as something that could be driven out" of Saudi Arabia and the Middle East and believed the US to be vulnerable. The strength of an effective

²¹⁰ Eastman and Brown, (2003). "Security Strategy in the Grey Zone," 93

²¹¹ Ibid., 92

deterrence strategy is predicated on a state's response to a terrorist attack. A weak response has the potential of undermining deterrence of future terrorist attacks. Through a series of specific attacks, the US had lost credibility in forcefully responding to the terrorist bombings.

Response to Islamist Terrorist Attacks Prior to September 11		
<i>Year</i>	<i>Attack</i>	<i>Overt U.S. Military Response</i>
1983	Beirut	Withdrawal
1984-86	American Hostages in Lebanon	U.S. concessions to buy freedom of hostages
1993	Mogadishu	Withdrawal
1998	Al-Khobar Towers	None
1998	Kenya/Tanzania	Cruise Missile Attack
2000	USS Cole	None

Table 8. US Response to Terrorist Attacks²¹²

Drawing from the list above, the bombing of the Marine barracks in 1983 had an immediate impact resulting in President Reagan's decision to pull remaining troops off shore and out of Beirut. Echoes of the US experience in Beirut repeated itself ten years later in 1993 when US members participated as part of the United Nations led operations called UNISOM I and later UNISOM II. With the transition from peacekeeping to peace enforcement, the focus turned to the capture of the warlord Mohammed Farah Aidid. Ultimately, the event culminated in the Battle of Mogadishu in October of 1993 where US forces lost 18 servicemen. The number of Somalis killed is estimated between 350 to 1,000 gunmen and civilians. In the end, like Beirut, US forces withdrew from Somalia.²¹³ In the case of Khobar Towers and the USS Cole, no response was

²¹² Paul Davis and Brian Jenkins, *Deterrence & Influence in Counterterrorism: A Component in the War on al Qaeda*, (Santa Monica, CA: RAND, 2002), 27.

²¹³ BBC News, "US Forces Killed in Somali Gun Battle," BBC News, October 4, 2003, http://newssearch.bbc.co.uk/onthisday/hi/dates/stories/october/4/newsid_2486000/2486909.stm, (June 4, 2005).

perceived as a response in itself. The lack of response appeared to have emboldened extremist confidence.

In their analysis, Davis and Jenkins emphasize the need to show strength consistently and not just at one point and time. “Rather, deterrence (and other forms of influence) will be enhanced if the United States conveys clearly that its determination is for the long run, with no respite, no forgetting, and no quarter.” Like the preemptive argument, much of the effort is spent in anticipation of a response by terrorist network. The use of deterrence alone is insufficient in thwarting a nuclear terrorist attack if the opportunity presented itself.

c. Assessment

As some experts agree, deterrence, in theory may hold some value. As in the previous section under prevention, a sting operation targeting supply, procurement, or terrorist networks may be effective from operational point of view with the potential to impact a terrorists’ decision-making for potential alternatives. However, as Davis and Jenkins points out, the track record is less than conducive in allowing deterrence to stand on its own. There’s room to reassess how to view deterrence as it applies to extremists or terrorist groups. One key aspect is to look carefully of what terrorist value or hold dear. As the Davis and Jenkins argue, “Finding levers is the easy part. Causing ostensibly friendly heads of state to use them, and do so reasonably, is hard.”²¹⁴ In the following chart, the authors provide a list of some potential options to influence terrorists.

²¹⁴ Davis and Jenkins, *Deterrence & Influence in Counterterrorism*, 48

Threatening What the Terrorists and Their Supporters Hold Dear	
<i>Participants in Terrorism and What they Hold Dear</i>	<i>What the United States Might Do</i>
Leaders <ul style="list-style-type: none"> - Power - Cause - Family Tribe, tribe, brotherhood 	<p>Turn leaders against each other (by disinformation, deception).</p> <p>Convince them that attacking the US undermines their cause; raise operational risks.</p> <p>Cause state leaders to prevent rewards to families of terrorists and even to punish them by withholding privileges; cause state leaders to harass terrorist leaders and punish them economically.</p>
Foot soldiers <ul style="list-style-type: none"> - Cause; excitement - Family, tribe, brotherhood 	<p>Raise operational risks; with continuing U.S. successes, both micro and macro, demonstrate the folly if the cause's path.</p> <p>See above.</p>
Financiers, etc. <ul style="list-style-type: none"> - Cause - Wealth, power, life - Family, tribe, brotherhood 	<p>Discredit their cause within Islam and society.</p> <p>Cause loss of wealth, prison, death, and dishonor.</p> <p>See above.</p>
Logisticians	Cause prison, death, and dishonor.
State Supporters <ul style="list-style-type: none"> - Power - Own Political Goals 	<p>Selected strikes and incursions (preemption); impose military, political, and economic sanctions; shun supporters of terrorism.</p> <p>Convince them that attacks on the United States undermine their cause; provide other ways to seek goals.</p>
Populations <ul style="list-style-type: none"> - Survival - Bitterness, blame - Cause 	<p>Provide hope (peace process, aid, liberalization, etc.).</p> <p>Broaden the range of ideas and views discussed.</p> <p>Remind them "who rides the bigger horse" (cite U.S. successes against al Qaeda, local suppression).</p>
Religious Leaders <ul style="list-style-type: none"> - Power, status - Personal and Family welfare 	<p>Trump (discredit them), warn them off, monitor them shut off funds.</p> <p>Cause prison, death, and dishonor, and prevent benefits to families.</p>

Figure 5. Targets of Influence²¹⁵

²¹⁵ Graph adapted from Davis and Jenkins, *Deterrence & Influence in Counterterrorism*, 48.

On the one hand Davis and Jenkins open the door to other alternative views of how and who to target operationally by broadening its strategy. They argue that the “strategy of *deterrence* is the wrong concept—it is both too limiting and too naive. It is far better to conceive a strategy with an *influence* component, which has both a broader range of coercive elements and a range of plausible positives, some of which we know from history are essential for long-term success.”²¹⁶ Further, by broadening the target set friendly forces may gain more leverage in understanding the core issues driving implicit or tacit support for political violence by extremist groups.

Taking Davis and Jenkins’ ideas further, Daniel Whiteneck recommends redefining the meaning by suggesting the following:

Rather than abandoning deterrence, it can be redefined as providing influence against moral, spiritual, educational, recruiting, and financial support of WMD terrorism by one of two sets of actors, either by states or nongovernmental, transnational, societal elements also referred to as the “Al Qaeda system,” consisting of religious figures and institutions, political leaders and movements, financiers, less ambitious or less global terrorist groups and guerrillas, and other entities that provide either direct or indirect assistance to Al Qaeda’s operations.²¹⁷

Once again, similar to the idea suggested previously for expanding the meaning of prevention, we see a call for a redefinition of the meaning for deterrence, as a push to exert influence and persuade rather than to rely on measures that coerce and intimidate. In so doing, we also open the door to the ultimate deterrent and preventive strategy, the root causes of political violence.

C. RECOMMENDATIONS

According to Daniel Byman and Mathew Waxman, authors of *Dynamics of Coercion*, there are four sets of key challenges that will confront policy makers in the future: “(1) constraints on the use of force emanating from domestic politics; (2) constraints imposed by coalition partners; (3) difficulties associated with

²¹⁶ Davis and Jenkins, *Deterrence & Influence in Counterterrorism*, 61.

²¹⁷ Daniel Whiteneck, “Deterring Terrorists: Thoughts on Framework,” *The Washington Quarterly*, vol 28, no. 3, (Summer 2005), 188.

humanitarian intervention; and (4) dangers involved in confronting adversaries armed with weapons of mass destruction.”²¹⁸ The authors postulate that public support will continue to drive decision makers to seek low-cost, low-impact alternatives to the use of force or coercion. Despite the attacks on 9/11, actions since the war in Afghanistan, namely operations in Iraq, continue to impact US influence in the Arab world and the Middle East. Extremism is not exclusive to Jihadist and Islamists in the Middle East, but exists throughout the world and the United States who see political violence as the only means to achieve desired results. Yet as the availability of new technology becomes more prolific and extremism ideology continues to rise, strategies that are preventive in nature should take precedence. As stated previously without nuclear material, there can be no nuclear terrorism, but what about the remaining options? Below is a table with a comparative look of each strategy as they apply to the post-9/11 era:

²¹⁸ Daniel Byman and Matthew Waxman, *The Dynamics of Coercion: American Foreign Policy and the Limits of Military Might*, (Cambridge, UK: Cambridge University Press, 2002), 19-20.

Coping with the Threat of Nuclear and Radiological Terror			
	Operational Complexity	In telligence Req'ts	Public Opinion
Coercive Diplomacy	Credibility needed is substantial.	Must have significant amount of intell to be credible coupled with ability to carry out options. Need strong cultural awareness.	Generally accepted but overall record is poor when dealing between states. Requires policy shift to deal with non-state actors.
Preemption	Extensive Intel Req'ts	Highest of all options	Somewhat accepted but impact of Gulf War II raises concern. While viewed as preemptive, IQ was more preventive
Prevention	Substantial but slightly less than Preemption in term of Intel reqts, but critical to success.	Significant: Results to drive cost to prevent	Resistant due to lack of success in discovering WMD in IQ. Focus on defending CONUS more accepted.
Deterrence	Retaliation	Low: Dependent of fidelity of forensics to ID those responsible	Acceptable: To retaliate for a 9/11 attack is more palatable than other options. Reactionary in nature.

Table 9. Assessment Criteria of Individual Strategies²¹⁹

1. Prevention First: As expressed in the idea that by removing nuclear materials from the equation you eliminate nuclear terrorism. However, this activity is one that cannot be performed unilaterally. Cooperation and a multilateral effort are critical to preventing a “superterrorist” event.

2. Mixed strategies: No one strategy can be effective on its own. As we have seen, effective deterrent and coercive efforts are dependent on multiple

²¹⁹ Author's notes adapted from lecture presented by Dr. John Arquilla in SO 3101 Conflict in the Information Age, November 3, 2004, Naval Postgraduate School, Monterey, CA

factors such as terrorist will and intent; access to nuclear material and supplies; effectiveness of preventive measures to get to and from a target; and the vulnerability of the target itself.

3. Credibility: Effective preemptive and deterrent strategies are difficult without credibility. As presented in Tables 2 & 3, credibility is a common theme in the adversary's assessment of their success. The less credible the nation appears, the greater the adversary's hope for success. As witnessed by several polls and as reflected in a 2004 RAND study²²⁰, US opinion in the minds of many in the Arab world has dropped in standing. As result, perhaps a strategy of less is more may help to reduce negative credibility. Allowing more of a "hands-off" approach in Middle Eastern affairs may allow for states to establish themselves would give states a sense of self-determination while removing the spot light off of US policy and involvement. If necessary, the concept of "by, with, and through" friendly states should be considered the norm and not the alternative. This may be one way to balance pressing needs while supporting friendly states.

4. Intelligence: The limits of intelligence have never been more pronounced than in the decision to go to war with Iraq. Without eyes on the ground the difficulty in validating whether or not weapons of mass destruction exists, the task is verifying is daunting. *The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction* identified there was, potentially, a rush to war. Rather than focusing on the shortcomings of the intelligence community and debating whether the U.S. administration knew what and when, the attention should be placed on how best to improve "what we know" and how best to fuse them into our strategic planning. In addition, improving the forensic capability to target, track, and identify material of origin may also complement deterrent strategies when dealing with states who may wittingly or unwittingly provide weapons-grade or radiological material.

²²⁰ Brian Rosen and Charles Wolf, *Public Diplomacy: How to Think About and Improve It*, (Santa Monica, CA: RAND, OP-134, 2004), 1-2.

5. Redefine targets of influence: In regards to strategies listed a call for redefining the meaning of each was identified. Specifically, shifting from deterrence to influence or expanding the definition of prevention to strive for the long term goal of resolving the roots of violent extremism reflects a need for greater understanding of the social, political, economic, religious and other factors affecting strategy development.

6. Focus on Social Movements: To date US policies have focused on two approaches: (1) dealing with state-to-state actors or (2) attempting to stop or thwart individual terrorist or terrorist groups.²²¹ In reference to earlier discussions presented in Chapter I, the focus of engaging in the early stages of a social movement may serve well as a means to develop preemptive strategies, potentially mitigating or isolating the more radical or extreme elements of a movement. Such an approach will require states like the U.S. to work with regional allies and in-country personnel to work by, with, and through and develop greater and deeper social and cultural awareness. By gaining a deeper understanding of the pertinent issues that relate to social movements states can better address key questions such as: Who are the key players? What are the movement's primary concerns? Who are the leaders? Is there a formal or informal social network? Is there a violent element within the movement? Is so why and what can be done about it? In studying social movements, we are actually analyzing the various processes that may be implicitly or explicitly "connected" or interconnected within a movement. A social movement in and of itself may be too big and diffused to analyze in its entirety. However, to the extent that one begins to see the interconnections of a social movement, opportunities to develop solutions and resolve disputes or diffuse extreme rhetoric can begin.

²²¹ NOTE: Within academia, much attention has been placed in attempting to interpret the motivation or the mindset of a terrorist.

D. SUMMARY

In the wake of the September 11, 2001 attacks, the issue of mass-destruction has raised security concerns to an unprecedented degree not seen since the end of the Cold War. In response to terrorism, policy-makers have focused the preponderance of US strategy to influence state actors in an effort to constrain or control the use of political violence by extremists. However, directing policies towards states may be ineffective and should instead consider policies that affect the broader social movements that transcend across state boundaries. Thus, US strategies must be crafted to affect states who instigate or assist transnational terrorism as well as social movements who are influenced by or support violent extremism. Thus the research question posed is which strategy or combination of strategies between coercive diplomacy, pre-emption, prevention, and deterrence, would be most effective in countering the threat of extreme violence, specifically the threat of nuclear and radiological terrorism?

In essence, prevention remains the first and foremost strategy to deter terrorists from obtaining nuclear and radiological materials. However, a combination of mixed-strategies such as deterrence, coercive diplomacy, and preemption can have an impact but in very specific situations. The short-fall will continue to be intelligence but way to analyze such likelihood for violence is to under the causes that spawn violent social movement from within the broader social movement. Such a methodology would enable a better opportunity to selective target specific audience with greater precision.

V. WINNING THE RACE AGAINST NUCLEAR TERROR

A. OVERVIEW

In 2002, President George W. Bush stated that "The gravest danger to freedom lies at the perilous crossroads of radicalism and technology.... when that occurs, even weak states and small groups could attain a catastrophic power to strike great nations."²²² Such a scenario would not only threaten the security of the United States, but send shock waves through the notion of the Westphalian construct of nation-states as primary actors within the international system. The community of nations would be compelled to confront the coercive power posed by non-state actors armed with nuclear and radiological weapons or acquiesce to non-state actor demands. To date, the U.S. has concentrated its strategic efforts on preventing states with potential links to terrorist organizations from acquiring a nuclear capability and limiting the threat of loose nukes by pursuing policies of non-proliferation. In fact, the author argues that states with the potential to proliferate nuclear weapons to non-state actors must remain a central component of US policy and strategic efforts. However, expanding the dialogue and critical thought to in applying flexible options targeted at sub-state level should also be considered. The question then is one of defining the targets of influence and how would strategies apply to sub-state actors?

Sub-state actors or transnational criminal networks with ability to access, acquire, and supply a terrorist network with nuclear material poses a different challenge all together. Such a scenario may reflect security concerns that are customarily associated with weak states or states with poor security measures in which terrorists operate and exploit permissive environments. As demonstrated by Aum Shinrikyo in Japan, weak or failed states are not the only ones who may be exploited. Relatively stable or strong states can fall victim too. As a result, one may argue that the intersection of supply, proliferation, and terrorist networks

²²² US Department of State, "U.S. Foreign Policy Agenda", *An Electronic Journal of the U.S. Department of State*, vol. 7, no. 2, <http://usinfo.state.gov/journals/itps/0702/ijpe/ijpe0702.pdf>, (13 June 05).

could constitute a nexus of nuclear terror. In essence, the race against nuclear terror is a race against merging networks with access and the means to acquire such destructive technology.

B. A MULTI-ANALYTICAL APPROACH ~ THE NEXUS OF NUCLEAR TERROR

In analyzing today's strategic approaches, current policies are focused on the supply side of the problem, with increased emphasis in counterproliferation and counterterrorism efforts to prevent nuclear terrorism. As presented through the case studies in Chapter III, a broader approach is needed to continue the pressure on potential networks to include supply, proliferation, and terrorist groups. Our first step is to view the interconnected nature of key processes that may occur in arming non-state actors with nuclear or radiological weapons.

Single-Dimensional ~ Top View

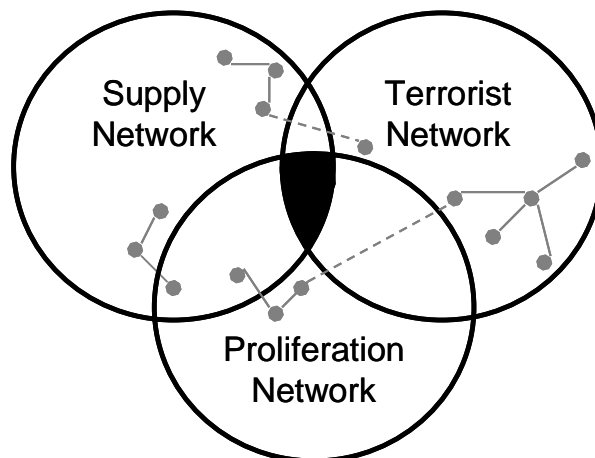


Figure 6. The Nexus of Nuclear Terror²²³

The three networks depicted by the single-dimensional model above represent key functions that are of concern to decision-makers in developing strategies to mitigate or prevent nuclear terror. For the supply network, the focus is on those group(s) directly involved in acquiring nuclear weapons or radiological materials to include highly enriched uranium or plutonium. In the context of this

²²³ Author's concept derived to explain the inter-connectivity between multiple functions and networks.
NOTE: The solid lines depict established contacts whereas dashed lines represent suspected contacts.

study, a supply network includes individuals/groups with direct access to nuclear and radiological material and charged with the responsibility to maintain or secure such technologies. At the most basic level, a proliferation network is concerned with individuals, groups, or criminal networks whose interests are in connecting suppliers with customers, in this case, terrorist groups with nuclear weapons. Following this train of thought, states who wish to directly provide weapons of mass destruction to terrorist groups would also serve a similar function as combined supplier/proliferation network reflected in the figure below.

Single-Dimensional ~ Top View

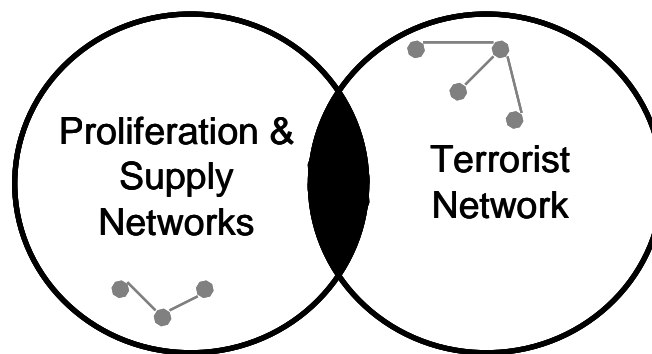


Figure 7. Collapsed Networks: Proliferation and Supply Networks²²⁴

In the previous chapter, both Aum Shinrikyo and al Qaeda attempted to acquire nuclear materials directly from sub-state actors from the former Soviet republics. Ultimately their attempts failed and both groups sought to develop an easier, less deadly alternative on their own, chemical and biological weapons. This case presents an example of the merger of two or more key functions within a group or network. The merger of two or more networks presents a deepening problem as characterized by today's concerns about a nuclear capable North Korea with the potential to proliferate nuclear materials to non-state actors.²²⁵

Finally the last scenario and area of primary concern is the fusing of all three functions into one network. That is, a terrorist network in the possession of

²²⁴ Author's concept derived to explain the inter-connectivity between multiple functions and networks.

²²⁵ Robert Norris and Hans Kristensen, "North Korea's Nuclear Program, 2005," (May/June 2004), *Bulletin of the Atomic Scientists*, http://www.thebulletin.org/article_nn.php?art_ofn=mj05norris, 64-67.

a nuclear weapon or radiological materials sufficient to create a bomb. Efforts to mitigate this dire problem involve constraining the degree of cooperation and permissiveness involved within each of these networks, either through internal or external controls; or through broader transnational regimes intended to control the degree of exchange between the various networks with terrorist groups.

By turning the model illustrated in Figure 6 on its side, we attempt to analyze the depth of coordination and exchange between primary networks. By placing the model on a multi-dimensional spectrum, we add an additional level of analysis to understand the Level of Coordination both within and between networks. As opposed to traditional coordination such as state-to-state interactions, other potential scenarios include: state-to-non-state actor, insider-to-network, or network-to-network coordination. The Level of Permissiveness depicted assesses how much each network is allowed to operate within and outside its environment. That is, an evaluation of how much control or authority is exerted by the state that enables or constricts networks the space in which to operate. For example, in the case of Aum, the cult successfully exploited Japan's religious tolerance and extensive laws protecting religious groups.²²⁶ Likewise, al Qaeda's influence over the Taliban in Afghanistan enabled the group to pursue efforts to obtain nuclear and radiological materials though failing in the end. Yet, both succeeded in pursuing an easier alternative of developing, testing and, in the case of Aum, employing chemical and biological weapons. However, in terms of proliferation, both actors failed in convincing proliferation networks in providing the essential materiel central to this thesis, nuclear and weapons-useable radiological material.

²²⁶ Sara Daly, John Parachini, and William Rosenau, "Aum Shinrikyo, Al Qaeda, and the Kinchasa Reactor," 3.

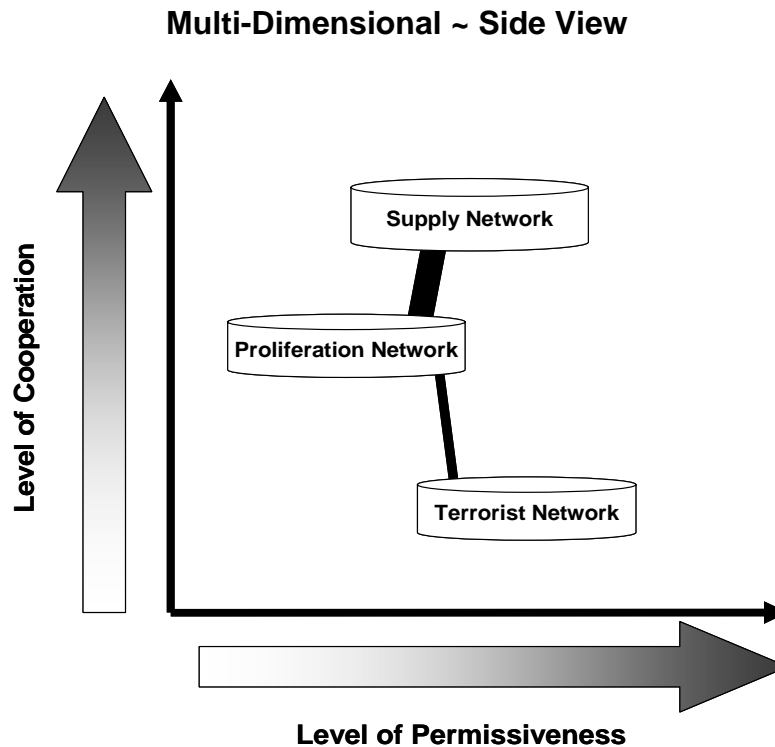


Figure 8. Interactions across Multiple Networks²²⁷

The figure above explores a multi-dimensional way to analyze and assess the “connectiveness” between key functions and networks. The lines connecting the different networks reflect the degree of coordination and cooperation between different functions. In the case of al Qaeda and Aum, both groups attempted to leverage their contacts to acquire nuclear and radiological material to develop a nuclear capability. In comparing both groups, Aum, with its contacts and in-house scientists, appeared to have had the better opportunity to purchase such material. The role of “proliferators” was less pronounced for Aum since it attempted to use its wealth and contacts to acquire nuclear materials by bribing officials. By way of Russia’s criminal element, al Qaeda had believed that they were in fact dealing with proliferators or, at minimum, individuals who could acquire such materials. In fact, according to Rohan Gunaratna, “intelligence sources now believe that criminal elements sold al Qaeda irradiated canisters

²²⁷ Author’s concept derived to explain the inter-connectivity between multiple functions and networks.

purporting to contain materials stolen from Russian army bases, whereas in fact the contents would have had no military value whatsoever had it been passed on to rogue scientists.”²²⁸ Applying the models to the case of al Qaeda we see the following:

Single-Dimensional ~ Top View

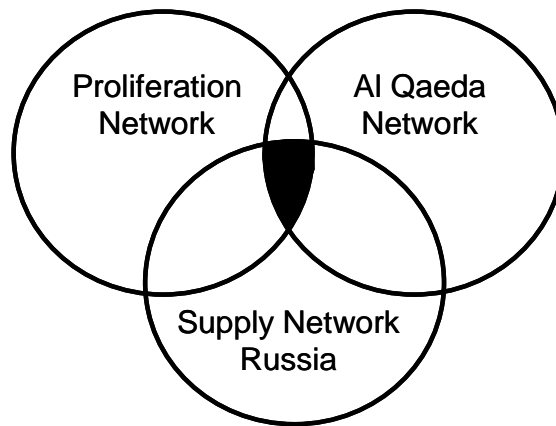


Figure 9. Al Qaeda’s Nuclear Ambitions²²⁹

Multi-Dimensional ~ Side View

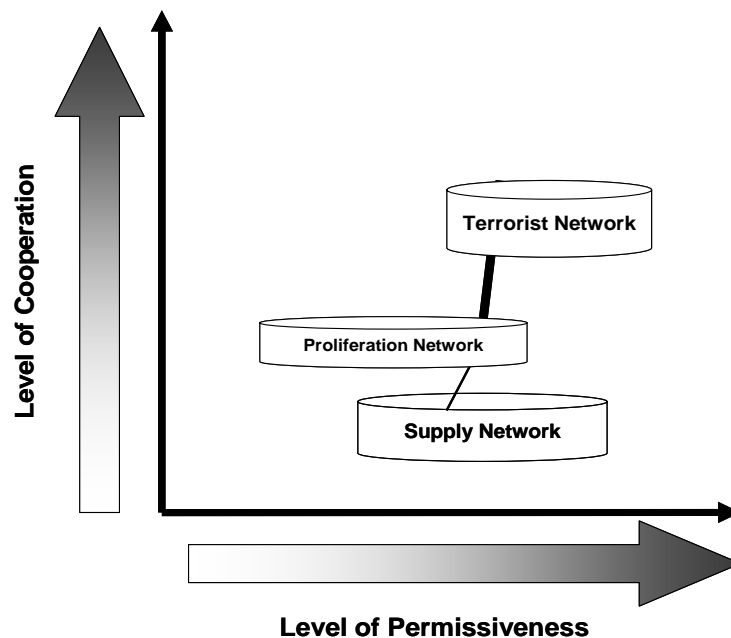


Figure 10. Al Qaeda’s Coordination Links²³⁰

²²⁸ Rohan Gunaratna, “Inside Al Qaeda: Global Network of Terror,” 15.

²²⁹ Author’s model used to explain al Qaeda’s interaction with supply and proliferation networks.

Al Qaeda's efforts to acquire nuclear materials was based on dealing with individuals who were nothing more than a criminal element that essentially "ripped off" bin Laden and al Qaeda's point man, Mamdouh Mahmud Salim, in buying what was red mercury and not radioactive materials.²³¹ As a result, the graph shows a proliferation network that is closer in cooperation with a supply network but less willing to coordinate with suppliers in providing a terrorist group with a nuclear bomb. From al Qaeda's perspective, the link between its organization and the proliferation group appears stronger than it really is. In part, al Qaeda had believed the proliferation network was willing to provide bin Laden's organization with nuclear materials. Unfortunately for al Qaeda, the proliferation network was not as cooperative as the group was led to believe. In the end, the proliferators had no intention of providing a weapon to the group. In essence, al Qaeda fell victim to a scam.

Applied to Aum, the author contends that the multi-dimensional diagram would be similar to that of al Qaeda with the exception of the linkage shown between the Aum and potential proliferators. Rather than a solid line between both networks, the author would use a thin or dashed line to reflect the tenuous connection between both networks. In the end, Aum also failed to convince proliferators to provide the group with a nuclear weapon or radiological material. One take-away is that terrorist groups are susceptible to stings and have the potential of being deceived. Follow-on research should concentrate on developing a deeper analysis of other potential opportunities and vulnerabilities to exploit and interdict these networks to include finances and communications. Such options should not be limited solely to terrorist networks but expanded to supply and proliferation networks as well. An indirect approach through proliferation and supply networks may yield critical data in mapping terrorist activities.

²³⁰ Author's concept derived to explain al Qaeda's coordination and interaction between multiple proliferation and supply networks.

²³¹ Stefan Leader, "Osama bin Laden and the Terrorist Search for WMD," (June 1998), *Jane's Intelligence Review*, vol. 11, no.6, 34-37.

C. TOWARD A “NEW” STRATEGIC FRAMEWORK

The previous chapter presented a comprehensive view of traditional strategies. Here, the focus is to build on the definitions presented in Chapter IV and present a notional discussion of how these strategies would apply against non-state actors. While these concepts are not “new” per se, the effort here is intended to examine the possibility of redefining these known strategies in the context of affecting proliferation, supply, and terrorist networks. It is important to understand that each network is motivated for different reasons. For example, al Qaeda’s instrumental reasons differ greatly from the for-profit intentions of a supply or proliferation network. The motivations and causes for why various networks operate vary widely and beyond the scope of this study. However, the knowledge and understanding of how and why these networks operate are a critical component to the intelligence necessary in shaping effective strategies. With this in mind the following matrix is presented in order to identify a potential target audience for each strategy within each network followed by a brief assessment of the applicability each strategy to the particular network.

Comparative Strategies Applied to Mitigate the Threat of Nuclear Terror			
	Proliferation Network	Supply Network	Terrorist Network
Coercive Diplomacy	<p><u>Target Audience:</u> States, leaders of transnational criminal networks</p> <p><u>Assessment:</u> Effective against states with potential application to network leaders assuming sufficient intelligence.</p> <p><u>Strategic Applicability:</u> Possible</p>	<p><u>Target Audience:</u> States, Gov't Officials, Scientists, Security Personnel, & Military</p> <p><u>Assessment:</u> Most effective against states. Requires multinational efforts; Must know actor's specific interests, concerns, & weakness</p> <p><u>Strategic Applicability:</u> Possible</p>	<p><u>Target Audience:</u> Terror group leaders, religious leaders, & operational planners.</p> <p><u>Assessment:</u> Assuming that terrorist cannot be deterred, strategy against terrorist networks will likely prove ineffective.</p> <p><u>Strategic Applicability:</u> Unlikely</p>
Preemption	<p><u>Target Audience:</u> States and criminal networks</p> <p><u>Assessment:</u> Intel intensive and more difficult to determine below the state level. Aimed at specific individuals and middle-men.</p> <p><u>Strategic Applicability:</u> Unlikely</p>	<p><u>Target Audience:</u> Scientists and Security Personnel at research centers, nuclear storage areas.</p> <p><u>Assessment:</u> Intense intel req'd but best group to interdict before weapon reaches terrorists.</p> <p><u>Strategic Applicability:</u> Possible</p>	<p><u>Target Audience:</u> Terrorist network</p> <p><u>Assessment:</u> Most difficult. Assumes specific tactical intel of weapon group location. Must know where/if other weapons are pre-positioned</p> <p><u>Strategic Applicability:</u> Last resort</p>
Prevention	<p><u>Target Audience:</u> Transnational criminal networks/corrupt officials</p> <p><u>Assessment:</u> Preventing network from proliferating requires interdicting comms links between criminal network & suppliers. Susceptible to "honey pots" posing as potential buyers.</p> <p><u>Strategic Applicability:</u> High</p>	<p><u>Target Audience:</u> Gov't officials, scientists, and security officials protecting technology</p> <p><u>Assessment:</u> Multinational effort needed to interdict; focus on preventing internal threat from providing access to or knowledge of materials. Emphasis in security.</p> <p><u>Strategic Applicability:</u> High</p>	<p><u>Target Audience:</u> Terrorist Operatives</p> <p><u>Assessment:</u> Domestic protection is the primary focus. Domestic ports, enhanced detection and forensic measures. Tracking of potential networks and individuals.</p> <p><u>Strategic Applicability:</u> High</p>
Deterrence	<p><u>Target Audience:</u> States, Criminal bosses and corrupt officials</p> <p><u>Assessment:</u> Must tailor to group, state actor or player. Requires highly active law enforcement and intelligence resources. Deception practice to discover extent of network would be effective.</p> <p><u>Strategic Applicability:</u> Possible</p>	<p><u>Target Audience:</u> Officials, scientists, security officials</p> <p><u>Assessment:</u> Consider positive incentives as a counter inducement strategy. I.e., focus on reasons for scientist not to support non-state actors. Stings and "honey pot" operations may prove effective.</p> <p><u>Strategic Applicability:</u> Possible</p>	<p><u>Target Audience:</u> Terrorist leaders and key members</p> <p><u>Assessment:</u> Least effective of all strategic options</p> <p><u>Strategic Applicability:</u> Not Likely</p>

Table 10. Applying Multiple Strategies against Non-State Actors²³²

In reviewing the matrix above, it becomes clear that no single strategy can stand on its own. Thus, combinations of strategies or mixed strategies emerge

²³² Author's application of the strategic matrix used to explain potential application of traditional strategies against non-state actors.

as the best approach to mitigate the threat of nuclear terror. As an example, the chart below applies a rating to the “Strategic Applicability” assessments included in Table 10. The table’s ratings are translated into an integrated assessment weighted against each network in the figure below. Adopting a multi-dimensional approach, the graph below reflects the output of a set of mixed strategies.

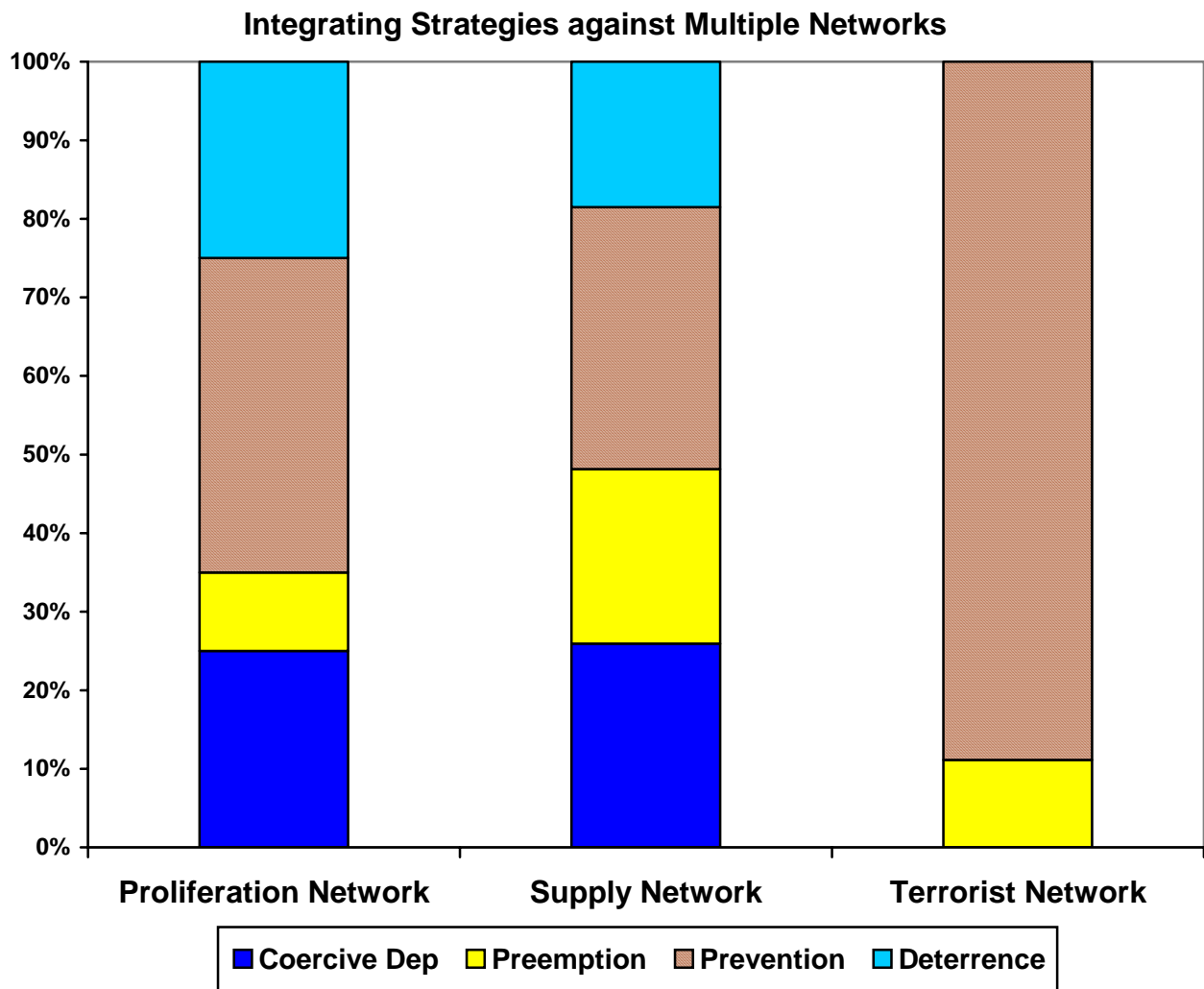


Figure 11. Developing Mixed Strategies²³³

²³³ Author's subjective analysis as applied in Table 9 under “Strategic Applicability.” Values assigned are as follows: High (8-10 pts), Possible (5-7 pts.), Unlikely (2-4 pts.), Last Resort (0-1 pts.). NOTE: In reviewing the chart, the most dominant strategies against a *terrorist network* is prevention (Strategic Applicability: rated High) and preemption (Strategic Applicability: rated Last Resort). Against a *proliferation network*, the most effective mixed strategy is prevention (Strategic Applicability: rated High), deterrence (Strategic Applicability: rated Possible), and coercive diplomacy (Strategic Applicability: rated Possible), and preemption (Strategic Applicability: rated Unlikely). Finally, against a *supply network*, the most dominant strategy is prevention (Strategic Applicability: rated High), deterrence (Strategic Applicability: rated Possible), preemption (Strategic Applicability: rated Possible), and coercive diplomacy (Strategic Applicability: rated Possible).

This tool is intended to provide users with a concept of integrating strategies as necessary to particular networks as part of the overall objective. By adopting a systems approach of attacking all three networks simultaneously, decision-makers will need to consider how strategies work in concert with one another. Future studies should analyze the interoperability of each strategy in order to find the appropriate set of mixed strategies to achieve the right formula based on the desired impact and results.

D. SUMMARY

While the research presented in this study is intended to examine the applicability of traditional strategies against nuclear terror, future research is needed to expand these concepts to operational and tactical application. Opportunities exist for deeper analysis in developing techniques on how such strategies may be applied to influence and affect proliferation, supply, and terrorist networks. Additionally, positive inducements such as dissuading scientist from engaging in proliferation or tactics to infiltrate these networks should also be further developed. For this thesis, however, the purpose was to examine which strategy or combination of strategies would be most effective in denying terror networks the ability to buy, steal, or develop nuclear weapons.

Specifically, this thesis examined and compared traditional strategies such as deterrence, pre-emption, prevention, and coercive diplomacy to assess their applicability in countering the threat of nuclear and radiological terrorism. As an adversary, the Soviet Union has been replaced by terror networks applying asymmetric warfare to achieve politically charged or ideologically induced objectives. While past theoretical approaches concentrated on a singularly defined target set, today's challenges are characterized by a more defused and decentralized network. Today's challenges compel US policymakers to create strategies that are both responsive and flexible in meeting the demands of responding to single unitary actors as well as transnational networks. Mixed strategies that are adaptable and flexible would clearly be a step in the right direction.

In order to better understand the nature of the threat posed by nuclear terror, Chapter II examined the perilous nature of nuclear proliferation while providing a basic primer as to the characteristics of a nuclear and radiological weapon. Chapter III examined two cases of attempts at nuclear weapons acquisition and development by non-state actors, Aum Shinrikyo and al Qaeda. The purpose of this chapter was to apply Martha Crenshaw's theory of organizational behavior and instrumental violence in order to better understand the motivations behind extremist groups in the pursuit of mass destruction. The two cases were unique in that, both groups had the means, ability, and opportunity to pursue their objectives but in the end fail.

In Chapters IV and V, this thesis examined the strategies of coercive diplomacy, preemption, prevention, and deterrence in order to assess its applicability against networks and non-state actors. The author argues that if non-state actors were to acquire a nuclear capability, its consequences would not only threaten the security of the United States, but would destabilize the Westphalian notion of nation-states as recognized unitary actors within the international system. Not since the Treaty of Westphalia and the creation of the modern system of nation states, has the international community faced a fundamental shift in the international system. As a result, this final chapter was focused on the application of strategies traditionally applied between states against non-state actors as way of understanding how they may be applied in today's context. This thesis concludes with the understanding that no single strategy is effective in and of itself. A combination of mixed strategy supported by a multi-dimensional analytical understanding of the threat will be essential to winning the race against nuclear terror.

APPENDIX A ~ NUCLEAR AMBITIONS

Cases of Nuclear Reversal since 1945				
<i>Never Tried (Nuclear Abstinence)</i>	<i>Tried but Gave Up (Nuclear Reversal)</i>	<i>Attained but Gave Up*</i>	<i>Still Trying</i>	<i>Attained and Maintained</i>
All (?) other states	Argentina Australia Brazil Canada [^] Egypt Germany Indonesia Italy Japan Netherlands† Norway† Romania† South Korea Sweden Switzerland Taiwan [∞] Yugoslavia†	Belarus** Kazakhstan** South Africa Ukraine**	Algeria† Iran [∞] Iraq [∞] Libya North Korea ^{^^}	China France Great Britain India Pakistan Russia United States Israel
<p>NOTE: There have been repeated assertions, but no hard publicly available data, that Finland, Greece, Spain, and Turkey may have also had nuclear weapons aspirations. In the absence of evidence to corroborate these assertions, these countries are excluded here from the category of nuclear weapons aspirants.</p> <p>* For the purposes of this study, the states listed in this category are considered as having undergone nuclear reversal.</p> <p>** These states had nuclear weapons deployed on their territory but not under their command. Only Ukraine appears to have had physical possession of Russian nuclear weapons deployed on its soil, although apparently not the codes necessary to launch them.</p> <p>† The determination and intensity with which these states pursued nuclear weapons remain uncertain.</p> <p>∞ These are states that appear to have sought to acquire nuclear weapons on more than one occasion.</p> <p>[^] Canada's nuclear weapons-oriented activity began with its participation in the Manhattan Project in the 1940s. Subsequently, it remained principally tied to the U.S. and British programs.</p> <p>^{^^} The status of the North Korean nuclear program remains uncertain, although the North Koreans are suspected of having produced one or two nuclear weapons in the mid-1990s. See National Intelligence Council, Foreign Missile Developments and the Ballistic Missile Threat through 2015: Unclassified Summary of a National Intelligence Estimate (Washington, D.C.: National Intelligence Council, December 2001). North Korea appears to have subsequently engaged in a clandestine enrichment project, and in late 2002 threatened to reactivate its plutonium production. But these actions apparently have not yielded any additional weapons-grade fissile material. See the Carnegie Endowment Nonproliferation Project's website at http://www.carnegieendowment.org/npp/ (accessed September 12, 2005).</p>				

Table 11. Cases of Nuclear Reversal Since 1945²³⁴

²³⁴ Levite, Ariel E., "Never Say Never Again", *International Security*, Vol. 27, No. 3 (Winter 2002/03), pg. 62

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APPENDIX B ~ SMUGGLING INCIDENTS

Incidents Involving Weapons-Grade Nuclear Material 1992-2001 ²³⁵	
<i>Incident</i>	<i>Synopsis</i>
Luch Scientific Production Assoc. Russia, 1992	This incident involved a chemical engineer and long-time employee of the State Research Institute, Scientific Production Association (also known as Luch) which is located 22 miles from Moscow. ⁴ Beginning in May 1992, over a 5-month period, the individual smuggled out of the institute small quantities of highly enriched uranium totaling 1.5 kilograms. In October 1992, the engineer was arrested because police suspected him of stealing equipment from the Luch facility. Once in custody, the police discovered the nuclear material that he had stolen. The individual did not have a specific buyer in mind, but was trying to determine if there was a market for the stolen nuclear material. He was tried before a Russian court and received 3 years' probation.
Vilnius, Lithuania, 1993	In May 1993, Lithuanian authorities recovered 4.4 tons of beryllium in a smuggling investigation. Beryllium is a metal that is used in the production of, among other things, x-ray tubes, lasers, computers, aircraft parts, nuclear reactors, and nuclear weapons. When Lithuanian authorities seized the material, they discovered that some of the beryllium (141 kilograms) was contaminated with approximately 0.1 kilogram of highly enriched uranium. There was no evidence that the individuals involved were aware that the beryllium contained the enriched uranium. Some reports indicated that the beryllium originated at the Institute of Physics and Power Engineering in Russia. This institute is involved in the research and development of nuclear power reactors and employs about 5,000 people and possesses several tons of weapons-usable material.
Murmansk, Russia, 1993	In July 1993, two Russian naval enlisted personnel stole two fresh fuel rods from a storage facility in Murmansk, Russia. These rods were for Russian naval propulsion reactors that power submarines and contained 36-percent enriched uranium. (Uranium enriched at 20% or greater is considered to be weapons usable material.) The amount of material totaled about 1.8 kilograms of highly enriched uranium. Russian security officers discovered the missing material and apprehended the individuals before the material left the Murmansk area. One of the individuals arrested was a guard at the facility and was suspected by authorities after the material was missing. The two enlisted personnel who were caught implicated two Russian naval officers in the plan. However, at the ensuing trial only the two enlisted personnel were convicted and sentenced to prison terms of 4 & 5 yrs.

²³⁵ U.S. General Accounting Office, "Nuclear Nonproliferation," <http://www.gao.gov/new.items/d02426.pdf>, (May 2002): 34-39. NOTE: The matrix was adapted in its entirety from the GAO report.

Murmansk, Russia, 1993	In November 1993, approximately 4.5 kilograms of 20% enriched uranium, intended for use in submarine propulsion reactors, was stolen from a fuel storage facility in the Sevmorput shipyard near Murmansk, Russia. Three individuals were arrested in connection with the theft, including two naval officers. The group stored the fuel rods in a garage for several months while they were looking for a prospective buyer. The three individuals were arrested and two of the men received 3-1/2-year sentences while the third person was acquitted.
St. Petersburg, Russia, 1994	In March 1994, three men were arrested in St. Petersburg, Russia for trying to sell approximately 3 kilograms of uranium enriched to 90%. The material was allegedly smuggled from the Elektrostal Production Association which is located in the Moscow suburbs. The facility produces low-enriched uranium for commercial nuclear power reactors and also has the capacity to produce highly enriched uranium for nuclear powered icebreakers and submarines. The material was smuggled out of the facility and approximately 500 grams of the material were found inside a glass jar in a refrigerator in one of individual's homes.
Tengen, Germany, 1994	In May 1994, German police discovered a lead container containing 0.006 kilograms of highly concentrated plutonium-239 in the home of a German citizen. The material found in the container was a mixture of many components, including aluminum, silicon, mercury, zirconium, broken glass, and brush bristles as well as the plutonium. The presence of mercury in the mixture suggests that the material may have been used as part of a red mercury scam. 5 In November 1995, the German national was sentenced to 2-1/2 years in prison for violating arms control laws. The sentence was added onto a 3-year term he was already serving time for counterfeiting.
Landshut, Germany, 1994	In June 1994, less than 0.001 kilogram of highly enriched uranium was recovered in Landshut, Germany, a city near Munich. This material, long with 120 low enriched uranium fuel pellets, was found as a result of a police undercover operation. The material was seized in an undercover police operation. Three individuals apprehended were citizens of the Slovak Republic and one was a resident of Germany. A German court sentenced several of the individuals to probationary terms but one of the group's leaders was sentenced to 2 years in prison.
Munich, Germany, 1994	In 1994, undercover German police acting as prospective buyers intercepted approximately 0.4 kilograms of plutonium at the Munich Airport. It is believed that the material originated in Russia's Institute of Physics and Power Engineering. The institute, which is operated by Russia's Ministry of Atomic Energy, is involved in the research and development of nuclear power reactors and possesses several tons of weapons-usable material. The material was in a suitcase that had arrived on a flight from Moscow. The individuals involved in the smuggling case were from Colombia and Spain. A German court sentenced the Colombian national to almost 5 years in prison and the Spanish nationals received prison sentences of between 3 and 4 years. All of the individuals were expelled from Germany after serving half of their sentences. By February 1996, Russian authorities had arrested several Russian accomplices, including a key figure involved in the theft of the material from the institute.

Prague, Czech Republic, 1994	<p>In December 1994, police in Prague, Czech Republic, seized approximately 2.7 kilograms of highly enriched uranium. The material is believed to have been stolen from the Russian Institute of Physics and Power Engineering. The individuals involved included a Tajikistan national, a former Russian nuclear institute worker, and at least one Czech national. The material was brought into the Czech Republic on a train and then hidden for about 6 months while the individuals involved tried to sell it. They were arrested after Czech authorities received an anonymous tip and a Czech judge gave several members of the group prison sentences ranging from about 18 months to 8 years. Two related incidents were reported in June 1995 and involved the seizure of highly enriched uranium in the Czech Republic. According to available information, the composition of the material and its location were linked to the 1994 Prague and Landshut incidents. In both instances, the small quantities of material involved indicated that it was a sample that could be used to attract a potential buyer.</p>
Rousse, Bulgaria, 1999	<p>In May 1999, Bulgarian customs officials at the Rousse border checkpoint seized a vial containing about 0.004 kilograms of highly enriched uranium on the Bulgarian/Romanian border. Rousse is a city that serves as Bulgaria's principal river port and is a transportation hub for road and rail traffic. The material was hidden in a shielded (lead) container inside the trunk of a car being driven by a Turkish citizen. The driver attempted to sell the material first in Turkey and then traveled through Bulgaria on his way to Romania, where he planned to find a buyer. A Bulgarian customs agent, using standard profiling techniques, suspected that the driver was a smuggler. A search of the driver's papers revealed a document describing uranium. When the driver attempted to bribe the customs officer, his car was thoroughly inspected and the officer eventually discovered the vial containing the weapons-usable nuclear material. Bulgarian scientists concluded that the material was highly enriched uranium. Although the source of the material is not certain, it is probable that it came from the Mayak Production Association in Russia. This large complex produces special isotopes used for industrial, agricultural, and medical purposes and also reprocesses naval and civil nuclear power reactor fuel for plutonium and uranium recovery.</p>
Kara-Balta, Kyrgyzstan, 1999	<p>In October 1999, two persons were arrested in the act of selling a small metallic disk containing 0.0015 kilograms of plutonium. The item was analyzed by the Institute of Nuclear Physics in Kazakhstan and the two individuals arrested were convicted and sentenced to prison.</p>
Batumi, Georgia, 2000	<p>In April 2000, Georgian police arrested four persons in Batumi, Georgia, for unauthorized possession of 0.9 kilogram of highly enriched uranium fuel pellets. Batumi is a seashore resort at the Black Sea located along the Georgia-Turkey border. According to one press report, the material may have been smuggled from Russia. The pellets mass and shape, together with the reported enrichment level, suggest that the pellets were produced for use in a commercial or experimental fast breeder reactor. Another report also stated that the smugglers were detected when they crossed the Russian border into Georgia, possibly by radiation monitoring equipment and were then trailed to the city of Batumi, where they were apprehended. It is believed that the individuals were trying to smuggle the material into Turkey.</p>

Tbilisi, Georgia, 2000	In September 2000, three persons were arrested at Tbilisi airport for attempting to sell a small quantity of mixed powder containing about 0.0004 kilograms of plutonium and 0.0008 kilograms of low enriched uranium, as well as a 0.002 kilogram sample of natural uranium. According to press reports, an official in the Georgian Ministry of State Security said that two individuals arrested were Georgian citizens, and the third was from Armenia. The individuals said they had brought the uranium and plutonium from Russia and Ukraine to sell it.
Germany, 2000	In December 2000, a worker at a closed spent fuel reprocessing plant removed radioactively contaminated items from the facility, deliberately evading radiation safety monitors. The contaminated items, described as rags and a test tube filled with aging waste material, contained a very minute amount of plutonium.
Greece, 2001	In January 2001, police found a cache of about 300 metallic plates buried in a forest in northern Greece. The material in the plates was determined to be plutonium and a radioactive source known as americium. According to one report, the material had been smuggled into Greece either from one of the countries of the former Soviet Union or Bulgaria. Each plate contained a small quantity of plutonium but the total amount was about 0.003 kilograms. An official from Greece's atomic energy commission said that the quantity of nuclear material found was insufficient to build a nuclear weapon but the material posed a health hazard. A law enforcement officer speculated that the individuals who buried the metal plates were probably waiting for a potential buyer.
France, 2001	In July 2001, police seized several grams of highly enriched uranium and arrested three suspects in Paris, France. According to preliminary reports, the enrichment level was about 80 percent, but results of laboratory analysis have not yet been reported to the IAEA. One of the suspects had recently completed a prison sentence for fraud charges, and the other two reportedly were citizens of Cameroon. According to one press account, French police found the material encased in a glass bulb that was stored in a lead cylinder.

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